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# Envis Eco-Echoes

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Name of the ENVIS Centre



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

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## EDITORIAL



There is an increasing realisation among the world leaders as well as the general populace on the catastrophic impact of various pollutions on the earth's environment. Scientists across the world are continuously keeping a track of the pollution levels and keep the political leaders aware of the causes creating such situation. When the cause is known, the solution also could be evolved. However there is a virtual war between

various countries over the issue how the burden of responsibility could be shared for reducing the Green House Gas Emission which is the main cause of Global Warming phenomenon. In December, 2009 world leaders converged at Copenhagen to strike a deal on the issue. While the outcome of the summit is being finalised, there is no doubt or controversy on the Green House Gas Emission reducing capability of plastics in general. ICPE ENVIS Newsletter had brought out the Executive Summary of the study conducted by McKinsey for International Council of Chemical Association giving the account of reduction of GHG emission by plastics.

In this edition, we have published the quantitative data of GHG emission saving by plastics packaging sector (2005), which includes plastics carry bags – vis-à-vis the comparing sector/s. A detailed analysis of the current issues on plastics carry bags has been published.

Suggestions by the industry and associations on the recent Draft Notification issued by the Ministry Environment and Forests, Government of India on Plastics (Manufacture, Usage and Waste Management) Rules, 2009 – salient points, have been published. Other topics on Awareness Programmes and Initiatives on Plastics Waste Management have been published.

It is encouraging that the Hits count of ICPE websites have increased substantially during the year 2009 and the total count has crossed 100,000 mark consistently for the last six months. There is an increasing trend in the number of downloads also. This establishes that the contents in this website draw valuable attention of the visitors. A brief account of the website Hits has been published.

Readers may send in suggestions for publication of specific topics of their interest within the main frame of ICPE ENVIS Centre agenda.

T. K. Bandopadhyay Editor

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 suggestion, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

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# **Plastics Bags – Current Issues**

Plastics have made significant contribution in almost every field of human activity today – Agriculture, Medical, Transportation, Piping, Electrical and Heat Insulation, Packaging, manufacturing of Household and Electronic goods, Furniture and other items of daily or specific use. Plastics in medical products like disposable syringes, blister packing of tablets and capsules, joint replacement prostheses, inter venous (IV) fluid bottles, blood bags, catheters, heart valves, etc., have significantly helped supporting the human life. Medical devices made of Plastics are implanted into the human body.

Packaging is one of the most important applications of plastics. In fact about 40% of plastics materials worldwide are used in packaging applications. Plastics have contributed in creating a sustainable, hygienic, energy efficient, cost effective and environmental friendly packaging system. Versatility of Plastics has allowed creating an efficient pilfer proof, hygienic and cost effective packaging of food products like milk, spices, edible oil, bread, confectioneries, rice, wheat flour, snack foods and various types of medicines. Plastics are used for packaging of cosmetics, toiletries and host of other consumer products of daily and special purpose use required all – rich or poor in urban cities or in the villages. This has been possible due to the following attributes of plastic materials:

## T. K. Bandopadhyay

Sr. Technical Manager, ICPE, Mumbai

- Safe & Hygienic Inert and Chemical Resistance
- Light Weight & Non-Breakability
- Excellent Barrier Properties Enhancing Shelf-life
- Superior Impact Resistance
- Sterilizable and resistance to bacterial and other microbial growth.
- Pilfer proof packaging
- Transparency as well as Opacity
- Lower Fuel Consumption and Product Loss during Transportation And all these... at lesser cost!

Contribution of plastics to human health is difficult to ignore. Plastic based packaging with the above-mentioned properties ensures reaching the best, hygienic and unadulterated product to the masses.

Despite all these benefits, Plastics Packaging in general and Plastic Bags / Carry Bags – which are a part of the packaging system, are under the scanner. Plastics are blamed for a series of Health, Safety and Environmental problems. Nonbiodegradability of plastics is attributed towards causing waste management problems and choking of the drains in urban cities. There are scores of other Myths also. Let us analyse these issues in more details to find out the real positions.



## **COVER STORY**

Life Cycle Impact Analysis (LCIA) is an important and modern scientific tool to analyse the total environmental impact of a product or activity on the Earth. The sum total of the environmental impact of a product or activity from its inception / production to transportation to market place, usage / reusage, recycling and disposal for disintegration or recovery of energy or the basic constituents of the material for producing the same or other materials of use – gives the indication of the product or activity's environmental friendliness or otherwise, compared to an alternative. Outcome of many LCA studies conducted by credible academic institutions and independent professional organisations of repute have proved that plastics have much lesser adverse impact on the environmental pollution compared to its alternative/s.

We will discuss the issue of Plastic Carry Bags first – which, according to some section of the society and some environmentalists, are causing environmental pollution to land and water and causing health hazards to human being and animals.

#### Plastic carry bags are:

- Essential for packaging / carrying of confectionery, bakery products
- Essential for packaging / carrying hygroscopic products like sugar / salt / jaggary
- Convenient for carrying fish / meat / poultry and other wet food products – no other appropriate alternatives
- Essential to carry commodities during rainy season
- Reusable several to very long times depending its structure and type
- Add convenience to day-to-day life
- Least costly

#### **Plastics and Paper**



Plastic carry bags generate 60 % less GHG emission than uncomposted paper bags & 79% less GHG emission than composted paper bags.



Plastic grocery bags consume 40% less energy during production and generate 80% less solid waste after use than paper bags.



Paper sacks generate 70% more air pollutants and ~ 50 times more water pollutants than plastic bags do.



Plastics and Paper both can be recycled. However it takes 91% less energy to recycle a kilogram of plastic than a kilogram of paper.

Actual values for energy requirement and the emissions to air and water during the production of 50,000 plastic and paper bags have been measured as given in the table:



### **Plastics and Jute**

Energy consumption for Manufacturing Raw Materials, Packaging and Transportation of 1 lac MT of Atta in Plastic (Polyethylene) bag is 63 GJ compared to 330 GJ in Jute bags. There is a saving of 81% in case of packaging in plastic bags. More over 35 GJ of energy can be recovered from the waste plastic bags while in the case of Jute the value is less than 50% of that.



Environmental Burden in kg Air Pollution	Jute Bag	Plastic Bag
СО	54.3	0.6
CO <sub>2</sub>	6610.2*	760*
SOx	134.8	5.2
Nox	68.1*	4.8*
CH <sub>4</sub>	39.5	3.2
HCL	5.3	0
Dust	67.6	1.4
Water Pollution		
Suspended Solids	352.3	0.2
Chlorides	4535.5	0.1

Emission	Gm/km	Excess Emission for jute Bags	Plastic Bags
CO <sub>2</sub>	781*	11107.3*	Taken as Basis
СО	4.5	64.0	Taken as Basis
HC	1.1	15.6	Taken as Basis
NOx	8*	113.8*	Taken as Basis
Particulates	0.36	5.1	Taken as Basis
Total Regulated Tailpipe Emission	13.96	198.5	Taken as Basis

\* Greenhouse Gases

The comparison holds good for plastic and jute carry bags as well.

The environmental burden in terms of emissions of Green House and other Gases during the production of the raw materials and the bags and subsequent transportation of the finished products in the above case reveals that emissions of carbon dioxide in case of jute is 6610 kg compared to 760 kgs in case of plastics during production and 11170 times more during transportation! Emissions of all other gases are also very high in case of jute.

During the production of raw materials and during the transportation of finished bags.

#### **Plastics and Textile bags**

Plastics manufacturing consumes 400 KWH / MT while composite textile mills consume 1310 KWH / MT.

Textile contributes 30% SOx (second highest by any sector) and 23% NOx (highest by any sector).

This gives a comparative analysis of environmental burden generated by paper, jute & textile bags which are not visible to naked eyes though, in comparison to plastic bags!



# **COVER STORY**

Green House Gas Emission saving by Plastics Packaging/ Plastic Carry Bags



Another study by McKinsey for International Chemistry Council (ICC) revealed that Plastics Packaging saved the earth from 220 Million Tons of Green House Gas Emissions (2005 figure). Total saving by Films was 67 Mn Tons, which included the saving due to plastic carry bags compared to paper carry bags.

It is evident that paper bags generally have a heavier environmental footprint as per scientific studies hence one needs to be very cautious about using them as a substitute for plastic bags with a hope that they (paper bags) protect our environment.

## Plastic Carry Bags and Health & Safety issues

Plastics being inert in nature do not pose any health hazard. All plastics in general meet the requirement of both national and international standards like BIS, FDA etc. Specific standards for plastic packaging used in food contact items have been laid down by national and international regulatory bodies. Plastic carry bags are generally made of polyethylene – the material used for packaging of liquid milk, pharmaceutical tablets, intra venous liquid bottles and in the packaging of scores of ready to eat or drink food items. Use of polyethylene in contact with foodstuffs, pharmaceutical products and drinking water is permissible as per specifications laid down in Indian Standard IS 10141-2001 / IS 10146-1982, etc.

### **Biodegradability Issue**

There are concerns raised that plastics being non – biodegradable, create disposal problem. While it is true that plastics are not amenable to biodegradation like other

organic matters, many alternate materials such as glass, metals are also not biodegradable. Conventional plastics packaging provides the highest product to packaging weight ratio in the same shelf-life requirement, thus necessitating least material input for packaging. The long life of plastics has added value to the product. However, for certain applications, the properties of plastics are desired minus its long life. In fact, the products are required to degrade after a specific period of time after its intended use, which otherwise created problem for recycling or disposal.

Biodegradable Plastics have been developed for some specific applications in mind. Its use in medical applications is very important. In other cases, use of biodegradable plastics is recommended in applications where recycling is not possible or difficult. India has adopted the international specification ISO/17088:2088 – on Compostable Plastics. ASTM (USA) and EN (EU) have similar specifications. However it is to be noted that biodegradable / compostable plastics require composting conditions for degradation. Mere dumping of the compostable plastics waste in the landfill will not cause it to vanish. The concept of Biodegradable Plastics for a mass application like carry bags will encourage littering. Spurious products cannot be detected in market place causing flooding of fake bags.

Some manufacturers claim to have developed a type of biodegradable plastics which when disposed off in the backyard / open air, degrade due to the action of oxygen / sun light and would provide relief to the civic authorities from the waste management woes. However, these types of products do not comply with the specifications of compostable plastics and nor have these been proved to be environment friendly. Regulatory Authorities of the developed countries have not yet accepted these types of degradable plastics for mass use.

A mixture of degradable and non-degradable plastics will disturb the plastics recycling activity. Recycling, which is a resource management activity, is more important than composting. Recycling augments the resource while biodegradation depletes the resource. Developed countries – major manufacturers of Biodegradable / Compostable Plastics – have not mandated use of Compostable Plastics for Carry Bags application in their countries. Compostable plastics are encouraged for specific application areas.

## Multilayered / laminated plastics packaging

There are allegations that multilayered / laminated plastics packaging system are causing an environmental pollution. The allegations are that these are not recyclable. Before coming to the particular issue of recyclability, let us first discuss – why we needed multilayer plastics at the first place.

One of the most important requirement for packaging – especially for food, pharmaceutical and some specialty products is barrier property of the packaging material. There are options for selection of a particular packaging material.

These are Glass, Tin, Steel, Paper including paper boards and Plastics. Use of plastics has already been discussed. Use of Flexible Packaging system has been developed over a period of time to attain an overall advantage over the solid / rigid packaging system. However, when the product to be packed requires adequate protection from the action of bacteria and other harmful organisms for a reasonably higher self life, only one plastic material is unable to provide the required protection. Technology offered solutions to overcome this problem by incorporating different plastics / polymer materials for designing the packaging system. This is how the concept of multilayer / laminated packaging was developed over a period of time. Let us discuss about a particular case study in the Indian context. Initially (mideighties) there was an attempt to pack edible oil only in a single layer and later in a 3 – layer co-extruded PE structure. However the self life of the oil could hardly be extended to 21 days or maximum one month. This was not sufficient to ensure the safety of the consumers. Regulatory authorities came up with the minimum self life for such products to at least 6 months or more. Here arose the requirement for a barrier film layer of a suitable polymer or a thin layer of aluminum, which could enhance the self life of the product. This types of packaging could offer safe and quality products at a cheaper cost and at the same time the environmental pollution also could be minimized due to light weight and lesser quantity of material used.

The burgeoning retail industry today entirely depends on laminated plastics and multilayered packages. Baby food, edible oil, potato chips, tea, coffee, packaged foods, shampoo and other health care products are all today packed in multilayered packages. Multilayer plastics packaging, with or without a very thin micro-coating of metal, usually Aluminium, replaces 100% glass, aluminium or tin containers. Glass and metal containers are much more energy consuming and generate more emissions to air and water during their manufacture and these are much heavier than multilayered plastics packaging necessitating more fuels during their transportation to market place, causing additional environmental burden. Through Life Cycle Analysis it has been conclusively established that plastics and especially flexible laminate packaging are much more environment friendly compared to the alternatives like Glass, Tin or other metal packaging systems for packing a variety of commodities, leave alone food.

As an illustration, let us see what will happen to the environment: to pack 8 ounces of beverage – 236 gms (say milk powder), it would take:

- 198.4 gms of a glass bottle with metal cap or
- 22.7 gms of PET bottle and cap or
- 11.3 gms of Aluminum can or
- Just 5.7 gms of flexible standup pouch.

It would take about 6.9 MJ / 8 oz of energy with a  $CO_2$  emission of 0.48 kg / 8 oz for glass bottle, 2.7 MJ and 0.13 kg per 8 oz for PET bottle; 2.4 MJ and 0.14 kg of CO, per 8

oz for Aluminum can compared to just 0.7 MJ of energy per 8 oz and 0.03 kg of  $CO_2$  per 8 oz of packing in flexible packaging.

The Indian common man who lives on minimum wages cannot afford to spend beyond set specific amounts of money on basic necessities. There is no viable alternative to pack 3 ml of hair wash other than in a flexible laminate. Similar is the case for 2 mg of coffee or 15 gms of soap, 40 gms of biscuits, 2 gms of chocolate, one strip of tablets and one condom.

Today all tooth paste tubes and various cosmetic / toilet products use multilayer packaging system. 100% aluminium or 100% glass or tin packaging would create a much larger burden on the environment and would upset the country's energy balance.

#### **Recycling of Multilayer / Laminated Plastics**

Multilayer plastics can be in fact are being recycled by a technology – Compression Moulding, to manufacture useful products as plywood substitute. However, as multilayer laminated structure is made of different materials, it is difficult to recycle the waste by conventional mechanical recycling process. The answer to this issue is to recover the energy from the waste. Cement kilns can successfully coprocess all types of plastics waste, including multilayer packaging waste, and recover the energy in an environmentally friendly manner replacing conventional coal substantially. Higher calorific values of plastics can thus be utilized with a lesser carbon footprint.

The issue of waste collection and transportation to the cement kiln sites can be resolved jointly by all the stake holders. Regulatory Authority / Government may lead this action. Many developed nations – Japan, European Union, UK and Australia have Packaging Waste Laws & Regulations to tackle this issue. While relatively smaller nations like Thailand can handle this problem, there is no reason why India cannot do it.

#### Waste Management Issue

Plastics in general and plastic bags / carry bags in particular are blamed as the major cause of Solid Waste problem. The reality is poor littering habit and inadequate infrastructure for management of solid waste is the root cause of this problem. Due to this we find all types of dry waste, including plastic waste, littered in our surroundings.

In India, plastics waste form only about 5% of the MSW stream in major urban cities. There is no technical problem of disposing the plastics waste. Plastics waste can be 100% recycled. Very thin plastic bags, though per se not hazardous and are recyclable, are often left behind by waste pickers due to economic reason. These very light weight plastic film waste do not generate reasonable return to waste pickers and hence are left behind creating waste management problem. To avoid this, Ministry of Environment and Forests, Government of India had in 1999



## **COVER STORY**

and amended in 2003, come up with Rules restricting the thickness and size of plastic carry bags (20 micron / 20 x 30 cm). Some State Governments had further modified the rules by increasing the minimum thickness. State Governments in Maharashtra, Punjab, West Bengal, Himachal Pradesh, Goa, Kerala and Meghalaya have increased the thickness ranging from 30 to 70 microns. The basic idea for this was to discourage illogical use of plastic carry bags and urging the people to reuse the bags several times. Thicker bags also add value to the waste and rag pickers are encouraged to pick up the waste (for forwarding to the recyclers). Delhi, Chandigarh and J & K Governments have, on the contrary, banned the use of plastics carry bags.

No developed country in the world has banned use of plastics carry bags. Plastics carry bags are widely used in USA, Canada, UK and the EU Countries and Japan without any size or thickness restrictions. Australian Government regulatory authorities have, however, planned to impose restriction to thin HDPE plastic carry bags with a target of reducing the use by 50% in three years. This attempt also seems to aim at encouraging the consumers to reuse the bags. There exist appropriate waste management systems to handle all types of MSW including waste plastic bags. Alternatives to plastics bags would create additional environmental burden and would also inconvenience common people. Plastics carry bags can be reused many more times compared to Paper Bags thus leaving substantially lower environmental foot-print. Different types of plastics bags are available to suit different requirements.

The solution to waste management problem lies in segregation of dry and wet solid waste at the source for which an effective mass awareness campaign is very important. Creation of efficient Solid Waste Management infrastructure coupled with encouraging establishment of recycling centres would help address the MSW problem. Plastics can be recycled to produce articles for mass use augmenting the concept of resource management. Many useful products have been developed with recycled plastics and large number of people is employed in these activities in small, micro and informal sectors. An informal industry estimate put the recycling figure of India at around 1.5 Million Tons – close to 50% of plastics used for packaging applications. This is a very high recycling ratio.

Apart from the conventional recycling, which is popular in India, alternate processes of plastics recycling are also required to be encouraged. Low-end, mixed and comingled plastics waste can be used safely for co-processing in cement kilns. Industrial fuel can be produced from all types of mixed plastics waste. Plastics waste has been used to construct asphalt roads. All these processes have been successfully tried and established in Indian conditions. Adherence for abiding to safe norms while recycling, as stipulated by the regulatory authorities, is a must. Proper education, facility, incentives and awareness can achieve this goal. In a recent study on the chacterisation of plastics waste in the MSW in the largest landfill in India – Deonar, in Mumbai, it was revealed that while the average MSW dumped in the landfill was 5%, more than 95% of this quantity of the plastics waste is picked up by the waste pickers for recycling, in effect leaving only less than 0.5% plastics waste in the landfill. This tiny part of the leftover plastics waste also could go to the cement kilns for supplementing the energy requirement. This is a clear indication that source segregation of waste could resolve our waste management issues.



CHARACTERISATION OF TOTAL WASTE

In India the infrastructure for handling of solid waste particularly in urban areas is woefully inadequate. Poor littering habit of the general public has aggravated the problem. Union as well as different State Government authorities had indeed imposed restrictions on use of thin plastics carry bags to contain the waste problem indirectly. However it is recognized that various Government Notifications were not implemented effectively. This led to an increased pressure on the local authorities to take more stringent measures including complete ban on plastic bags. We have seen that complete ban on plastic carry bags is not the solution - rather it would encourage use of alternate materials creating an increased environmental pollution in the real sense and ultimately leading to the cause of climate change – a more dreaded reality the world is facing today. A voluntary cooperation and self-regulation by the industry and the public at large and adequate action by the Government Authorities can solve the waste management problem.

#### Sources:

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- DuPont Packaging awards for innovation
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- US Energy Information Administration
- US EPA, "Municipal Solid Waste in the United States 2007 Facts 7 Figures"
  DR Battelle Managinal Institute Paraetters the system shifts of Florible Paraetters
- FPA Battelle Memorial Institute Report on the sustainability of Flexible Packaging

## AWARENESS PROGRAMMES

# Awareness Programmes in Schools/Colleges



Guru Nanak Khalsa College of Arts, Commerce & Science, Matunga, Mumbai



Back row – L to R: Dr. (Ms.) Rajendra Kaur Patheja-Principal; Ms. Seema Redkar - BMC; Mr. T. K. Bandopadhyay – ICPE. Front row: L to R: Dr. (Ms.) Gopa Sharma and other teachers.



A special awareness programme was organised at the college campus for encouraging segregation of waste at source among the students and college staff. A competition was organised among the students for collection of dry waste and depositing the same at a dry waste store room in the college. Students collected more than 600 kgs of dry waste within the one week time frame. Prizes were



## Happy School, Daryaganj, New Delhi

An awareness programme was conducted at Happy School, Daryaganj, New Delhi, on October 9, 2009. Around 400 students of class 6th to 8th attended the programme.





distributed to student groups who collected more quantity of dry waste. Later ICPE organised for the waste dealers who picked up the dry waste from the College Campus by paying an average price of Rs. 5-6 per kg of waste. The college authority declared that it would utilise the fund for the waste management programme. The process of collection of dry waste by the students is continued.

Two composting bins also were installed in the college garden for composting all wet waste generated in its canteen. Thus an attempt has been made to practice 'Zero Garbage' Concept in Khalsa College Campus and to encourage the adjacent colleges to replicate the system in their institutes too. ICPE and Brihanmumbai Municipal Corporation (BMC) fully cooperated with the enthusiastic college students and teachers led by its principal.





## WORKSHOPS & SEMINARS

Workshop on 'Solid Waste Management' with emphasis on 'Plastics Waste Management' at Chandigarh: 10th-11th December, 2009



L to R: Ms. Savita Pradeep, Mr. S. C. Laroiya, Mr. Ram Niwas, Prof. Paramjit Singh, Mr. Anil Jain, Mr. Sanjeev Gupta.

On the continuing aim to identify new directions, develop collaborative actions for managing post-consumer plastics packaging waste by bringing together all the stake holders for effective waste management in urban cities, ICPE organized the MoEF sponsored Workshop on Waste Management on December 10th-11th, 2009 at NITTTR Auditorium, Chandigarh, jointly with Indian Plastics Institute (IPI) – Chandigarh Chapter, All India Plastics Manufacturers' Association (AIPMA) and National Institute of Technical Teacher's Training and Research (NITTTR). Around 85 delegates from various industries, Government Departments, Municipal Corporation, Academicians, Research Institutions, Consultants, NGOs and Recyclers, etc., participated in the workshop. Mr. Ram Niwas, IAS, Home Secretary, Chandigarh was the Chief Guest and Mr. Anil Jain, Chairman, State Level Environment Appraisal Authority of MoEF and Director, SSS-National Institute of Renewable Energy was the Keynote Speaker. Prof. Paramjit Singh, Chairman, IPI Chandigarh and Dr. S. C. Laroiya – Officiating Director, NITTTR, delivered a Special Address.

Ms. Savita Pradeep represented ICPE. Mr. Sanjeev Gupta of IPI concluded.



The issues of the enormous quantity of waste generated in the country and the need to evolve sustainable solutions for management of the same were deliberated in the session. The responsibility of citizens for segregating waste, anti-littering, misconceptions about plastics materials were also deliberated upon in the session. The Chief Guest urged the participants to deal with the challenging issue with a missionary zeal. He said the project required dedication and commitment as it was easy to manage beautiful thinks in life and very difficult to manage dirt and filth. Dr. Anil Jain laid emphasis on collection, sorting, processing and disposal of solid waste and plastics.

## Two-day Workshop by CIPET at Chennai: 14th-15th December, 2009



Mrs. Neelkamal Darbari addressing the delegates.

A Workshop was organised by CIPET during 14th-15th December, 2010 at Chennai. This event was organised mainly for finding any project on research or commercial scale between India and the University of Toronto, Canada in the broader field of Clean Technologies involving Plastics as one of the main subject. Mrs. Neelkamal Darbari, I.A.S. - Joint Secretary, Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilisers, Govt. of India, inaugurated the Workshop and stressed for developing new technologies to deal with Plastics Waste Management issues. Among the various projects of Toronto University - Prof. Mohini Sain, Professor and Director of Centre for Bio Composites and Biomaterials, talked about the concept of Bio Refinery for manufacturing the basic raw materials - propylene, ethylene, etc., from all sorts of hydrocarbon waste, which could be polymerised subsequently. He expressed confidence that Bio Refinery could one day replace Oil Refinery for the purpose of providing basic raw materials for plastics and fertiliser industry.

Mr. T. K. Bandopadhyay of ICPE made a presentation on "Plastics – Benefits, Issues of Waste Management and various options for Recycling".



## CMS Vatavaran Film Festival New Delhi: 27th-31st October, 2009



ICPE Participated in the CMS Vatavaran Film Festival held at India Habitat Centre, New Delhi from 27th to 31st October, 2009. Various awareness films produced by ICPE were screened in the ICPE stall. ICPE short films - Living in the Age of Plastics and Use of Plastics Waste in the Construction of Asphalt Road were also screened in the main event at the Stein Auditorium along with films made by leading environmentalists. Copies of the awareness leaflets/booklets Facts about Plastics Bags, ICPE write ups on technologies of plastics waste management, Pointcounterpoint & Frequently Asked Questions, It's My World and copies of recent editions of newsletter - Eco Echoes/ ENVIS were displayed and were handed over to visitors who showed interest on issues of plastics and environment and waste management. Products made of recycled plastics were also displayed.

Visitors included Government officials, film makers, journalists, media personnel, educational institutions, research institutes, delegates from foreign embassies, lecturers, teachers, school and college students and the general public. Encouraging comments have been received



by visitors who were appreciative of ICPE's efforts in plastics waste management and anti-littering and the good display of educative material. Special requests were received for organizing awareness programs in schools/colleges/ universities with the display of panels put up in the ICPE stall.

## Plast Expo 2009 Rajkot: 8th-11th November, 2009

ICPE participated in the Exhibition at Rajkot organised by Saurashtra Plastics Manufacturers Association 8th to 11th November, 2010. Awareness Panels of ICPE were displayed and awareness booklets were distributed. ICPE films were screened.





## New Short Film on Awareness Released

As per agenda of creating awareness on plastics – its benefits, myths and realities, various issues and solutions, a new short film has been produced by ICPE. The film titled – "Listen... Plastics have Something to Say", shows various applications of plastics and deals with various environmental issues



and the real positions. The major reasons of environmental pollution and the position of plastics thereof have been clarified. Waste Management issues and the solutions through proper segregation of waste at source and various recycling options have been explained. The 12 minutes film has been uploaded in ICPE website, which can be downloaded. For projection purpose, DVD may be obtained from ICPE Secretariat by Associations/Institutions.



# Draft Notification – Plastics (Manufacture, Usage and Waste Management) Rules, 2009

## Issued by the Ministry of Environment and Forests on 17th September, 2009

On 17th September, 2009, Ministry of Environment and Forests (MoEF), Government of India issued a Draft Notification - S.O. 2400 (E), titled "Plastics (Manufacture, Usage and Waste Management) Rules, 2009, which was notified in the Gazette of India on 18th September, 2009. The Draft Notification was issued in supersession of the existing Recycled Plastics Manufacture and Usage Rules, 1999 and invited objections or



suggestions from any persons with respect to the said draft rules within 60 days for considerations.

Plastics Industry and Associations, Trade Bodies and other organisations including ICPE had submitted their objections and suggestions to the Ministry in this respect. While the MoEF is in the process of analysing and considering these objections and suggestions, the salient points of the Draft Notification are given below:

#### **Clause 5: Conditions:**

- (a) "carry bags and containers made of virgin plastics shall be in natural shade;
- (b) no person shall use carry bags or containers made of recycled plastics or biodegradable plastics for storing, carrying, dispensing or packaging of food stuffs;
- (c) carry bags and containers made of recycled or biodegradable plastics and used for purpose of other than storing and packaging foodstuffs shall be manufactured using pigments and colorants as per the Bureau of Indian Standards' specifications: IS 9833:1981 entitled "List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water";
- (d) no person shall manufacture, stock, distribute or sell carry bags made of virgin or recycled plastics or biodegradable plastics, which are less than 12x18 inches (30x45 cms) in size and less than 40 microns in thickness:
- (e) no person shall manufacture carry bags or containers or pouches or multilayered packaging from biodegradable plastics unless these meet the Bureau of Indian Standards' specifications: IS/ISO 17088:2008 entitled "Specifications for Compostable Plastics"
- (f) no person shall manufacture, stock, distribute or sell nonrecyclable laminated plastic or metallic pouches, multilayered packaging's, and other non-recyclable plastics.

General suggestions by plastics industry and associations are briefed below (not in chronological order):

#### 1. Uniform Rule all over the Country

It is required that the same set of rules prevail all over the country. Different State Governments or Municipality Authorities of different Cities should not come out separate rules in different places.

### 2. Carry bag thickness, colour and usage

Fundamentally any restriction on thickness of carry bags directly goes against the principle of conservation of resources. In fact as science and technology progresses, resources have to be used less and less to deliver the required results. In the field of plastics application technology have evolved in such a manner that even thin micron bags are able to carry weight with other properties such as flexibility etc. Therefore laying down the minimum thickness of bags is not rational and is against the principle of conservation of resources.

However, it is recognised that the existing 20 microns thickness was imposed in view of the prevailing solid waste management situation in the urban cities, as a compromise. It was expected that recyclers will find it worthwhile to pick up the thicker carry bags and thus promote better recycling of plastic carry bags. Wherever these regulations have been implemented strictly along with a strong public awareness programme against littering and an efficient waste collection mechanism, these regulations have served the purpose. It is however noticed that each State Government have issued their own regulations, increasing the thickness of the permissible plastic carry bags, without any tangible improvement in solid waste management situation. It is clear that mere increase in the thickness of carry bags is not going to solve the problem. What is required is an integrated solid waste management programme which has the following components:

- Solid Waste segregation and collection mechanism at source.
- A proper infrastructure to deal with transportation of wastes including mixed waste.
- Comprehensive programme for dealing with wet waste on decentralized basis.
- Better management of the landfill particularly for the mixed waste coupled with scientific incineration programme.

- Encouraging recyclers to handle the dry waste including the plastics in different localities.
- A strong anti-littering and awareness programme to promote segregation at source.
- Involvement of industry & NGOs along with municipal bodies in management of Solid Waste.

In the absence of such a comprehensive integrated solid waste management programme, mere increase in the thickness of plastic carry bags will serve no purpose.

Carry bags and Containers should be separated as the application and safety aspects, etc., are vastly differ from each other. Considering the usage pattern, it is agreed that "carry bags" meant for carrying ready to eat food items – solid or liquid, shall have to be made of virgin plastics in natural or white shade. Carry bags used for other than ready to eat or drink items – like garments, general merchandise products, raw vegetables, unpeeled fruits, grocery store items other than ready to eat or drink food, etc., can be made of either virgin or recycled plastics, with or without colours and pigments. In case colours and pigments are to be used, the same should be as per BIS 9833:1981 – reaffirmed 2003.

Containers, meant for storing ready to eat or drink food or pharmaceutical items, in solid or liquid form, shall have to be made from virgin plastics. Many pharmaceutical formulations like Cough Syrup, Sensitive liquid medicines are essentially required to be packed in Amber Coloured containers. In India, overhead water tanks, usually known as SINTEX Tanks, are compounded with carbon black in outside layer for protection from UV radiation and white pigment in the inner surface layer for visual inspection of any contamination of foreign particles. Many branded products including food products have been using a specific colour to protect its identity and brand equity. For example, the product 'Vanaspati' (vegetable ghee) is mostly packed in yellow coloured containers.

There are innumerable types of food and non-food products which are packed in plastics containers. Most of the products need better protection and hence are packed in virgin plastics containers. Due to technical and commercial reasons, these containers are required to be made with different colours and pigments. Pigments and colours can be used as per BIS 9833:1981 – reaffirmed 2003. Containers not meant for storing or carrying ready to eat food, pharmaceutical products or drinking water may use either virgin or recycled plastics with or without colours and pigments. Colours and pigments, when used, shall have to conform to BIS 9833:1981 – reaffirmed 2003.

### 2. Use of Biodegradable (Compostable) Plastics

It is well known that Compostable Plastics would not biodegrade /compost of its own. Proper and adequate composting procedure is required to decompose this type of plastics with the soil. In absence of proper mechanical / industrial composting system in place, this type of plastics will remain in the waste stream without undergoing degradation like the non-biodegradable plastics. Mechanical / industrial composting system has not been established in the landfill areas of Indian Cities and in the villages. Introduction of Biodegradable (Compostable) Plastics for mass application products will create more waste management problem. Moreover use of Biodegradable (compostable) plastics would create more carbon dioxide and methane, both Green house Gases, apart from increasing the requirement of more overall energy for making new set of products. Recycling is a better option in all proportions.

#### **Conflict with Recycling Activity**

Waste of compostable plastics will create additional and greater problem of mixing up with recyclable plastics waste, jeopardising the recycling process. In our country we have not been able to segregate the Dry and Wet waste till date despite introduction of Solid Waste Management (Handling) Rules way back in the year 2000. If the Biodegradable (Compostable) Plastics are introduced in such mass application product like "carry bags" and other packaging materials, these will be required to be separated from the normal (non-biodegradable) plastics carry bags and other products, so that the two varieties do not get mixed together and jeopardise the entire recycling activity.

#### Identification

It is not possible to identify in the market place whether a plastic product is truly compostable or not, more so for a mass application product like "carry bag". This would lead to a chaotic situation in the overall plastics waste management system in the entire country. Earlier it was generally declared that it was not possible to measure the thickness of a carry bag and hence it was not possible to identify the defaulter (manufacturers of bags thinner than 20 micron – the permissible limit as per existing rule). Thickness measurement is a relatively easier task with the help of a palm held thickness measuring equipment or by weighing a known number of carry bags and comparing the same with a known table – a well established method as mentioned in the existing Gazette Notification.

However in the case of Biodegradable (Compostable) plastics carry bags, there is no way to identify the genuineness of the quality (compostability). This would add to the problem of waste management.

# 3. Use of colour and pigments for recycled plastics products

Use of colour and pigments should not be made mandatory for recycled plastics products. However, if colour and pigments are used, the same should be as per BIS 9833: 1981 – reaffirmed 2003.

# 4. Proposal for banning laminated plastic or metallic pouches, multilayered packaging and other non-recyclable plastics

The affected industry has vehemently opposed this proposal and suggested dropping of the clause. As per definition, 'Material Recovery' and Energy Recovery' both form part



of recycling process. Multilayered (non-biodegradable plastics) packaging materials are recyclable by both routes – material recovery or energy recovery. Using mechanical recycling process, multilayered plastics waste are being moulded to 'Compressed Boards' – which replaces conventional ply wood boards, pallets for various applications.

All types of plastics waste including multilayered plastics waste can be co-processed in the cement kiln in an environment friendly way thus recovering the high calorie energy from the plastics waste. The emissions have been scientifically tested and were found to be much lesser than the emissions when only coal is used in the kiln. Hence there is no necessity to put this clause in the Notification.

Multilayer plastics packaging, with or without a very thin micro-coating of metal, usually Aluminum, replaces 100% glass or tin containers. Glass and Tin containers are much more energy consuming and generate more emissions to air and water during their manufacture and these are much heavier than multilayered plastics packaging necessitating more fuels during their transportation to market place. Through Life Cycle Analysis it has been conclusively established that Multilayered Plastics Packaging system is much more environment friendly compared to the alternatives like Glass, Tin or other metal packaging systems.

If manufacture of laminated plastics is to be stopped then various food products, tooth paste tubes and various

cosmetic/toilet products have to switch to either 100% aluminum or 100% glass or tin packaging, which would create a much larger burden on the environment and would upset the country's energy balance, which is already in critical stage. Technically it is possible to use rigid plastics packaging in place of multilayered plastics packaging. However this also would need more energy and additional fuel for transportation besides adding more cost of packaging, compared to the multilayered plastics. And this does not solve the solid waste disposal problem unless these are collected through an efficient system for recycling and reuse.

A very thin coating of metal, usually of aluminum, is used as a barrier material for the construction of some types of multilayer packages. Mechanical recycling by way of compression moulding is possible for the waste of such packaging. Energy recovery is also possible. However, mechanical recycling by using compounding extruder is difficult with these types of structure. To enhance the scope of mechanical recycling, the Ministry may initiate a dialogue with the concerned industry to find out alternative laminate structure discarding the metal coating. Special polymers are available to replace the metal coating for providing equally good barrier properties, at a higher cost though.

MoEF has been requested to consider all the above points, along with other points, before taking a final view on the proposed notification.

## **Plastic Road at Delhi**





ICPE and Central Road Research Institute, Delhi, are working together to evaluate the performance of a new technology for using plastics waste for the construction of bituminous road. Accordingly, a stretch of 600 m length and 10.75 m carriageway of 40 mm thickness was laid using this technology on 19th November, 2009 at the test section allotted by Delhi State Industrial and Infrastructural Development Corporation (DSIIDC) for the project on MP7 road between the intersections of MP6 to Yamuna Canal at Bawana, Delhi, in front of model house. The road stretch will be on regular observation by CRRI – ICPE team.

# **Major Raw Materials used for Manufacturing Plastics**



## **ICPE Website Hits**

There is a steady increase in the number of Hits in three ICPE websites. The total Hits are more than 100,000 consistently from August 2009 onwards. A summary record has been given in the chart.

ICPE - Website Hits Jan-09 to Dec -09



January	79,266	May	84,526	September	1,02,214
February	81,906	June	82,205	October	1,15,962
March	95,920	July	95,883	November	1,17,449
April	83,116	August	1,05,068	December	1,11,156

# Do Not Litter. Keep Your Environment Clean.

- Segregate and Throw Waste Only in Waste Bins.
- Use Two Bins One for Wet Waste, One for Dry Waste.



Plastics, Metals, Paper ... Can be recycled into useful products.

> Waste Food and other Biodegradable Waste. Can be composted into manure.

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