



Vol 2, Oct/Dec. 2001, No. 4

# Eco-Echoes

ICPE NEWSLETTER

Quarterly Publication of Indian Centre for Plastics in the Environment

## MILK PACKAGED IN Polypacks



शुद्ध पौष्टिक दूध पौलीपैक में



## ECO CONTINUES TO ECHO



Eco-Echoes, the ICPE Newsletter completes two years of its publication and distribution with the current number. Since its inception during January-March 2000, this ICPE quarterly publication has travelled all over India through schools, colleges, Exhibitions, Conferences, Seminars, Meetings, Plastic Manufacturers' Associations, concerned Government departments, State Pollution Control Boards, Media and Hotels including international institutions in Europe, U.S.A. and Japan. All along, it has been well received by the readers both by the students, executives, officials and managers at various levels. The ICPE Newsletter continues to upgrade and enlarge its contents. There is always scope to improve upon its presentation. Suggestions and technical contributions are always welcomed from readers.



Vol. 2, Oct/December 2001 No. 4

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### IN THIS ISSUE

- |                          |  |       |
|--------------------------|--|-------|
| <input type="checkbox"/> | Eco continues to Echo                      | 1     |
| <input type="checkbox"/> | Milk Packaged in Polypacks                 | 2     |
| <input type="checkbox"/> | For used PET Bottles-Compactor installed   | 3     |
| <input type="checkbox"/> | ICPE AGM                                   | 4     |
| <input type="checkbox"/> | Plastivision India 2001, Mumbai            | 5-6   |
| <input type="checkbox"/> | ICPE Stall a Big Draw                      | 7     |
| <input type="checkbox"/> | Slogans Constitute A Receptive approach    | 8     |
| <input type="checkbox"/> | Plastiscope 2001, Calcutta                 | 9-10  |
| <input type="checkbox"/> | EU Packaging and Packaging Waste Directive | 10    |
| <input type="checkbox"/> | Awareness Programmes                       | 11-12 |
|                          | • Green Fair                               |       |
|                          | • Through Ballet                           |       |
|                          | • School Programme                         |       |
|                          | • Bin Culture                              |       |
| <input type="checkbox"/> | Conference on Environment Management       | 13    |
| <input type="checkbox"/> | Forthcoming Conferences                    | 13    |
| <input type="checkbox"/> | Do You Know                                | 14-18 |

#### Cover: Milk Polypacked

(Material assistance derived from Materials World, Modern Plastic, APME, is gratefully acknowledged)

Readers are invited to send their contributions in the form of short notes/news item, new products development, case studies relating to Plastics and the environment, recycling technology, waste management, etc. for Publication in the Newsletter.

All correspondence regarding ICPE Newsletter should be addressed to the Editor Eco-Echoes ICPE, Vijaya Building, 10th Floor, 17, Barakhamba Road, New Delhi-110 001, INDIA. Material published in the Newsletter may be freely reproduced, but its due acknowledgement will be appreciated.

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Chemicals and Petrochemicals Manufacturers' Association, New Delhi  
PlastIndia Foundation, Mumbai



## Milk Packaged in Polypacks

Milk is an essential food for all age groups due to its good nutritive values. Its supply and distribution has all along been traditionally through dairies located in various cities and towns, using containers of different sizes and materials like, metals and plastics.

Packaging of milk and its distribution through handy polypacks has altogether revolutionized the requirement of a common man all over India. Assuring quality of milk, its supply through chain of organized dairies and distribution outlets has established its marketing under various brands like Mother Dairy, Paras, Parag, Gopalji, Saras, Milkman, Madhusudan, Vita, Gagan, etc. Simultaneously, the usefulness of environment-friendly polyethylene plastic for polypacks, has been demonstrated.

The used polypacks have a resale value since these are collected by waste dealers for recycling.

-Editor

India is the world's largest producer of milk with 81 million tonnes production in the year 2000-01. This has been achieved due to the white revolution which commenced prior to 1947 and was subsequently driven by the Co-operative Movement at Anand (Gujarat). This involves over 70 million farmers and 100 million milch cattle. The milk is collected through a very vast network of village collection centres. It is duly tested, transported to chilling centres and pasteurized.

In spite of the very wide distribution network of milk, only 778 out of 3750 cities and towns currently have access to packaged milk. Even today, almost 3000 cities and towns have to depend on loose, un-pasteurized and often adulterated milk.

Over 204 Government dairies as well as smaller private dairies pack 30 lakh litres of milk per day. A number of dairies pack an average of 4-6 lakh litres of milk per day. It is estimated that there are approximately 300 brands of milk in polypacks which are supplied across India.

Approximately 46 percent of the total milk production is consumed in liquid form while the rest is converted into ghee, khoa, powder milk, ice-cream, cheese, etc.

Once milk reaches the dairies, it is pasteurized and packed in Form-Fill-and-Seal machines (FFS) which have the ability to pack continuously an average of 35-50 pouches per minute. The polyethylene film roll is placed on top of the machine and it forms a pouch, fills it with the milk and seals and drops into a holding tray. The entire operation lasts barely 1.5 second. The duly filled pouches are then kept in a cold room at 4°C for 8-10 hours in plastic crates before being loaded and transported to the various milk outlets.

India is unique in making available fresh milk twice a day at the doorstep in all the major towns and this is possible only due to milk being packed in pouches. This is the easiest and cheapest option available as each pouch of 1/2 litre weighing barely 4 gms costs only 25-28 paise and this holds and helps transport milk to homes across India.

Even in the year 2001, only 26 percent of liquid milk was branded, packed and sold to consumers. A large volume is still sold loose. Of the total milk packed in India, almost 95 percent is packed in Polyethylene pouches as these provide the most convenient and least cost option as compared to glass bottles.

Milk is packed in prime Polyethylene and after use, this can be duly recycled into good quality films for packing any other products except cooked food.

The challenge to India is to greatly expand the dairy network, so that hygienic, convenient and inexpensive packaged milk can be made available to the vast population that still procures loose and often adulterated milk.

- Veena Mathur





## For Used PET Bottles ...

**Compactor Installed at Mumbai Central Station**

One of the key objectives of ICPE is to work together with civic authorities and other Govt. Departments in facilitating collection and recycling of plastic waste through technological inputs.

Indian Railways are a large source of plastics waste in the form of PET bottles (drinking water), food packaging, tumblers, cups etc. Part of the waste is collected and sold to recyclers, large amount of waste gets strewn on the rails or littered inside and outside the coaches. Plastics are light in weight but rather voluminous and any attempt for collection of the waste gets hampered because of difficulty in transporting the voluminous waste. ICPE have devised a compactor that can be used to reduce this volume by compacting so that transportation becomes relatively easier .

ICPE team worked together with senior officials of the Western Railway Mr.



*Mr. K.G. Ramanathan seen addressing the function*

Jain. The function was attended by members of ICPE Executive Committee, railway officials and the Media representatives.

Welcoming the initiative, Mr. Nikhilesh Jain said " An estimated 2,000 PET bottles are collected or found littered daily at the station. Based on the success of this project, we will consider installing such compactors at other railway stations as it would solve the problem of disposing voluminous waste."

Mr. K. G. Ramanathan, President, Governing Council ICPE -stated " Bottles are either strewn around or used for undesirable purposes by urchins and other elements. High transport costs make the disposal difficult. The compactor has been specifically designed to facilitate crushing; and baling of the bottles so that they can be easily sent for recycling into materials such as cushions, bedding, boxes, trays, strapping etc."

Typical products made out of recycled

PET were displayed.

Dr. A. N. Bhat-Director General, ICPE, explained, " the problem is not with plastics but with the habit of dumping all types of waste into open sewers and drains. The solution lies in proper and judicious waste management by the Municipal authorities and the public. Apart from the convenience, hygiene and presentation, the economics and durability factors play a critical role. Plastic is 100 % recyclable and is one of the most eco-friendly, non-toxic and safe material that conserves resources."

Mr. Brijesh Dixit-ADRM, Western Railway-said " The machine will be installed near the coaching depot which is the last point of disposal. An earlier project by a voluntary agency had failed."

The compactor has been operating at the Mumbai Central since October with good success. The capacity of the machine being very high, the operating hours are short. The two contract work-



*Mr. Nikhilesh Jain seen cutting the ribbon heralding the installation of compactor*

Nikhilesh Jain -Divisional Railway Manager, Mr. Brijesh Dixit -ADRM and Mr. A. K. Tewari, Sr. DME to install this compactor at a cost of Rs. 1.75 lacs with a capacity of 6- 8 bales per hour at the Mumbai Central station, Western Railway has provided space and power for operating the compactor at Mumbai Central.

The Project was inaugurated on October 4, 2001 by the DRM Mr. Nikhilesh





ers on the job collect bottles from various parts of the station, bring the bottles to the storage bins at the compaction site.

The caps, labels are then removed

manually from each bottle since these are made from other type of plastic material and can interfere in the PET plastic recycling process. With this, the bottles are ready for compaction. The collection rate is around 100 -1500 bottles a day. The compacted bales are taken away by the recycler appointed by ICPE and transported to the recycling units.

One of the major producers of mineral water, namely "BISLERI" has shown interest in the project and sought ICPE cooperation.



ICPE has plans to install similar Compactors at other Railway Stations in the country.

### Mumbai, December 12, 2001

## Annual General Meeting of ICPE in session



Mr. K.G. Ramanathan, President GC and Mr. M.P. Taparia Chairman EC, with other members.







# PLASTIVISION INDIA 2001

The All India Plastics manufacturers' Association (AIPMA) organized PLASTIVISION INDIA 2001 Exhibition at Mumbai during December 6th to 10th 2001. The Exhibition was inaugurated by Hon'ble Shri. Satyabrata Mukherjee, Union Minister of State for Chemicals &

Fertilizers, Government of India on 6th December 2001 at NSE Complex, Goregaon.

The AIPMA has been organizing National Exhibitions since 1992. The earlier Exhibitions were held during



Mr. Arvind Mehtha, President AIPMA (L) and Mr. Harilal L. Boolani, Chairman Exhibition Executive Committee seen addressing the inaugural function



Lighting the ceremonial lamp: the Hon'ble Minister Mr. S.B. Mukherjee (M); Mr. Rajiv Tolat, Co-Chairman Exhibition Executive Committee (L) and Mr. Harilal L. Boolani (R)





1992,'93,'95 and 1998, PLASTIVISION 2001 was the 5th Exhibition, which attracted 320 exhibitors including participants from Germany, Japan and U.S.A who put up displays of their products and activities, covering an area of 14000 sq. mtrs. PLASTIVISION INDIA Exhibitions have become popular with the plastics industry. The Exhibition attracted a record number of visitors, over a lakh and a half, and business worth Rs. 50 crores was transacted.

Among the participants in the Exhibition included Reliance Industries Ltd., Gas Authority of India Ltd, Haldia Petrochemicals Ltd., DGP Windsor Kabra Extrusion Technik, Larsen & Toubro Ltd., Godrej & Boyce, Barlocher India Additive Pvt. Ltd., Ciba Specialities Chemicals (India) Ltd., and Colour Chem Ltd.,

besides Plastics Manufacturers' Associations, CIPET and Indian Centre for Plastics in the Environment (ICPE).

A visit to the Exhibition provided an insight into the size and scale of operations of Indian Plastics Industry as illustrated herein.





## THE ICPE STALL A BIG DRAW

The Indian Centre for Plastics in the Environment (ICPE) had put up a stall in PLASTIVISION INDIA 2001 at Mumbai. The large number of visitors showed keen interest in the activities of ICPE in particular in the field of Plastics and Environment. The ICPE had designed a very educative and informative display through Charts, photographs, Website, Audio-visual presentation supplemented



by distribution copies of Technical literature and Newsletter "Eco-Echoes."

Among the visitors to the stall included Hon'ble Minister Union Minister of State for Chemicals & Fertilizers' Government of India, Shri. Satyabrata Mukherjee, who remarked,

"Today campaign is going on to discourage the plastics. But here lot many goods are seen to be made out of the plastic waste. A proper awareness to the use of plastics and reusability of plastics will lead to remove these misconceptions".

During the course of the Exhibition, ICPE had conducted a Slogan competition, which received a good response from the visitors, writing down altogether 23 Slogans. These make a very healthy reading, for the benefit of the readers and are reproduced here.



## Slogans constitute a receptive approach :

The most convenient thing to use -  
PLASTICS

For the able bodied and the SPAS-  
TICS

... Kunal

Plastics make the lives comfortable.

... Kamal Gupta

1. Plastic are the most versatile ma-  
terial.
2. Put plastic at the right place

... Mahendra Yadav

1. When environment sustains the  
world, plastics sustains the world.

Use plastics, save environment,  
Nature's bounty is not endless.

2. Do not blame plastics, for human  
failure.

Do not litter after use, keep your  
city clean

3. Your waste is our wiser solution.  
Bin culture is a step forward.

4. Love plastics.

5. Together for Plastics.

... A. Sudhakar

1. Do not throwaway the PET  
bottles, you may be sitting, walk-  
ing or sleeping on it in the near  
future.

2. The way to throw the PET bottles:  
Make them into geotextiles

... K. Gurudatt

Our children are playing with plastics,  
let them play and plastics for all.

... V.P.S. Prabhuram

Plastics are eco-friendly

... Ms. Bhakti Yadav

If not used properly, plastics do not  
stick but drains the profit

... Romit

1. Champion of champions: Use  
enviro-friendly reusable, recy-  
clable PLASTIC. 2. Secure a  
healthy future. Save forests. Join  
the movement USE PLASTICS"

... Ketan Ghia

1. Sukha kachara, Gila kachara Alag  
rakhiye, apana parisar swachha  
sunder banaiye.

2. Sukha Gila kachara mila ke,  
honge bimari ke shikar,  
vargikaran karke payenge  
sundarta ka uphar.

... Bhagwat BMC

"Littering to bin culture"

... Ravindra Babu

1. Plastic is considered as destruc-  
tive element, but it is eco-friendly.

2. Plastics a two edged sword. De-  
stroyer and Eco-friendly. Be wise  
to opt for the later .

... N.G. Asher

1. AS ALL OF US KNOW THERE  
ARE TWO SIDES OF THE COIN,  
DESTRUCTIVE (PLASTICS)  
AND CONSTRUCTIVE **ARE**  
**MINE** FOR MORE INFORMA-  
TION GET IN TOUCH WITH  
**PLAST VISION**

2. PLASTICS  
Perishable -NO  
Lasting and  
Aiding you from your first breath  
Successfully  
Till your last Inspiring  
Confidence and a  
Source eco-friendly for your  
daily use.

... Shetan Asher

The 1st Prize winner :

**Plastics, the material is eco-  
friendly. But the littering attitude  
makes it pollution-friendly**

... Renu Verma

Plastic Age-Zenith of Material Revo-  
lution

... Commander S.V. Chavannavar

Ease your life -Use plastics.

... Nikhil Hegde

**HAVE NO FEAR, PLASTIC IS FOR-  
EVER**

... Ms. Miloni Udeshi

Do sensible and safely use plastic  
products

... Nayan Vora

**PLASTICS DO CHOKE THE  
EARTH  
BUT BETTER THAN WOOD,  
WHICH EATS UP THE MANKIND.**

... MURTAZA TASHRIF

It is just a **MIND BLOCK**,  
IF overcome, the "**PLASTICS**"  
Fear can **UNLOCK**.

... Mrs Neelam Motwani

Let us use more quantity of PLAS-  
TICS and make life BMER.

... Satheesh Kumar

**LITTERING** means **POLLUTION**  
& **PLASTICS** means **PROSPERITY**  
Choose the one!!!!

... Rimy Bhat

Generation next product -PLASTIC  
We are recyclable, reusable.

... Sachin Chobey



## PLASTISCOPE 2001

The Indian Plastics Federation, (IPF) Kolkata, jointly with Indian Plastics Institute (Kolkata Chapter) organized a one-day Seminar **PLASTISCOPE 2001** on "Green Plastics - An Eco-Friendly Approach" at Hotel Taj Bengal on December 20, 2001. The objective of the Seminar was to remove the various myths and misconceptions about plastics and also to counter the anti-plastics propoganda being carried out in India.

The Seminar helped understand the issues of environment more seriously and the steps needed to be taken by the Government Departments, Municipalities and NGOs to encourage segregation at source, increase recycling and manufacture non-critical products from such municipal wastes like lumbers, park benches etc.



Lighting the ceremonial lamp by Mr. Manabendra Mukherjee, Hon'ble Minister of IT & Environment, Government of West Bengal (above) and by Mr. R. Saldanha, MD, Haldia Petrochemicals Ltd. (below). Also seen in the picture (L) is Mr. Ashok Chawla, Joint Secy. to the GOI, Deptt. of Chemicals and Petrochemicals and CMD, IPCL.

the Seminar including concerned persons and organizations in addition to Central and State Government Ministries and Departments and those connected with the development of plastics industry in India.

The Seminar was Inaugurated by Mr. Manabendra Mukherjee, Hon'ble Minister of IT and Environment, Govt. of West Bengal. The Inaugural Session was honoured by the presence of Mr. Shyam Tibrewal, President, Plastindia Foundation, Mumbai, and Mr. Ashok Chawla, Jt. Secretary, Dept. of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers and CMD, IPCL as Chief Guest. Mr. Richard B. Saldanha, Managing Director, Haldia Petrochemicals Limited, delivered the Keynote address. Mr. R.A. Lohia, President, Indian Plastics Federation, welcomed the dignitaries and distinguished guests, which was followed by an introduction to the Seminar by Mr. Amar Seth, Chairman, Seminar Organizing Committee. Mr. Alok Ghosh, President, Indian Plastics Institute (Kolkata Chapter) gave the Vote



of Thanks.

The winning posters of the sit and draw competition against littering organized by Haldia Petrochemicals Ltd. in 12 schools in Kolkata were also put up for display at the Seminar Venue.



The Seminar was sponsored by Gas Authority of India Ltd., (GAIL), Haldia Petrochemicals Ltd., Indian Centre for Plastics in the Environment (ICPE), Indian Petrochemicals Corporation Ltd. (IPCL), Reliance Industries Ltd., and Smitabh Intercon Ltd.

A Souvenir was brought out for distribution to over 400 delegates who attended



Mr. Vijay Merchant seen addressing the seminar





After the prize distribution to the winners of the sit and draw competition against littering, the Theme Papers were presented by Dr. A.N. Bhat, Director General, ICPE and Mr. Vijay Merchant, Chairman, Enviroplast Committee, Plastindia Foundation and Member, ICPE. While Dr. Bhat presented a case for removing apprehension regarding perceived environment negatives of plastics, Mr. Vijay Merchant spoke on the Industry Initiatives on Environment & Plastics Recycling. The theme papers were followed by a lively panel discussion moderated upon by Mr. Kishore Bhimani, a distinguished radio commen-

tator and journalist. Besides Dr. A.N. Bhat and Mr. Vijay Merchant, the panelists consisted of Mr. A. V. Iyengar, President, Concern for Calcutta – an NGO, Dr. Satyesh C. Chakraborty, a Social Scientist, Mr. Utpal Chatterjee, Editor, Business Economics, Kolkata, and Dr. Dipankar Shah, a distinguished agricultural scientist.

Audio Technical Presentation was made by experts from Gas Authority of India Ltd., Noida, Indian Petrochemicals Corporation Ltd., Vadodara, Reliance Industries Ltd., Mumbai and Haldia petrochemicals Ltd., Kolkata. The papers

dealt in the conversion of plastic waste into Value Added Products – Waste to Wealth – and the Environmental Implications of Polymer Processing and Degradation. Dr. A.S. Bhattacharyya, Managing Director, Auropal India Pvt. Ltd., Kolkata, summed up of the Technical Session.

A film of ECO-WUD – an innovative example of a wood substitute – made out of waste plastic and jute caddies, produced jointly by the University Grants Commission and St. Xavier's College was also shown during the Seminar.

## EU PACKAGING AND PACKAGING WASTE DIRECTIVE

*The purpose of this directive is to harmonize the management of packaging waste (packaging used industrially, commercially or in the household); to promote the return, recovery and reuse of packaging waste; and to replace EC Directive 85/339.*

- The directive covers all packaging and packaging waste whether industrial, commercial or household; primary (sales packaging), secondary (group packaging) or tertiary (transport packaging).
- The directive defines packaging, used packaging, packaging waste, packaging waste management, prevention, recovery, recycling and disposal.
- The directive sets EU Member State targets regarding the recovery of packaging waste at no later than five years from implementation of the di-

rective into national law:

- 65 percent by weight should be removed from the waste stream for recovery;
- 45 percent by weight of packaging material should be removed for recycling and must be recycled;
- Greece, Ireland and Portugal are allowed a later deadline (not to exceed December 21, 2005) but must reach at least 25 percent recovery in the first five years.
- EU Member States are instructed to provide for the return of all used packaging and/or packaging waste from the consumer, waste stream or final user to channel it to appropriate uses, and to ensure that used packaging or packaging waste is reused, recovered and/or recycled.
- The packaging and packaging waste

return and management systems are to be designed in such a way that there are no barriers to trade or distortions of competition for imported products.

- Within five years from implementation into national law, all packaging shall comply with the marking provisions of Article 6 and Annex I of the directive. Markings are to be appropriately durable and any Community rules for eco-labeling for packaging are to be harmonized with this directive.
- EU Member States are instructed to take all appropriate measures to ensure that only packaging that complies with the "essential requirements" of this directive may be placed on the market.
- Manufacturers must participate in the program in accordance with Member State Law.



# AWARENESS PROGRAMMES

ICPE continued to organize Awareness Programmes for the benefit of Schools. During the period ICPE was invited to conduct and participate in following programmes: Copies of ICPE Newsletter were distributed to the students.



**GREEN FAIR** organized by Modern School, Vasant Vihar, New Delhi on November 8, 2001. Dr. Iqbal Malik, who inaugurated the fair, seen accompanied by Ms. Goldy Malhotra, Principal (L), going around ICPE Exhibits.



Kendriya Vidayalya  
Paschim Vihar,  
New Delhi

Principle Dr. (Mrs.) Santosh Grover seen receiving ICPE momento

School  
Programme  
December 21, 2001





.....Ballet



The Ballet was sponsored by the ICPE and organized by Little Dream Merchants Welfare Society for the benefit of students. The Ballet was coordinated by teachers of this school as well as the parents of the participating students. The presentation of the ballet was appreciated by all those who attended it. The ballet focussed its presentation on daily uses of plastics.

Awareness Programme conducted through Ballet by the students of Modern School Barakhamba Road, New Delhi, December 20, 2001.

## BIN CULTURE

ICPE carried forward its message of "Keeping the City Clean" by promoting bin culture in schools. ICPE contributed bins to the following 22 schools and one college in New Delhi where Awareness Programmes had earlier been conducted.

1. Guru Harkrishan Public School, Vasant Vihar
2. Kendriya Vidyalaya, Sector-8, R.K. Puram
3. Kendriya Vidyalaya, Sector-4, R.K. Puram
4. Kendriya Vidyalaya, Sector-2, R.K. Puram
5. Kendriya Vidyalaya, Vikas Puri
6. Kendriya Vidyalaya, Pitampura
7. Kendriya Vidyalaya, Andrews Garh
8. Kendriya Vidyalaya, NTPC, Badarpur
9. Kendriya Vidyalaya, INA Colony
10. Kendriya Vidyalaya, Arjun Garh
11. Kendriya Vidyalaya, Paschim Vihar
12. Kendriya Vidyalaya, Gole Market
13. Army Public School, Dhaulan Kuan
14. Springdale School, Dhaulan Kuan
15. Bhartiya Vidya Bhawan, K.G. Marg
16. Sadhu Vaswani Intl. School for Girls, Shanti Niketan
17. Lady Irwin Sr. Secondary School, Canning Road



Kendriya Vidyalaya, R.K. Puram Sector-2



Kendriya Vidyalaya, Vikas Puri



Kendriya Vidyalaya, R.K. Puram Sector -4

18. Ryan International School, Vasant Kunj
19. G.D. Goenka Public School, Vasant Kunj
20. Vasant Valley School, Vasant Kunj
21. DAV Public School, Vasant Kunj
22. Sarvodaya Vidyalaya, INA Colony
23. Convent of Jesus & Mary College



Kendriya Vidyalaya, Paschim Vihar



Kendriya Vidyalaya, Pitam Pura



## CONFERENCE ON ENVIRONMENT MANAGEMENT



ICPE participated in a Conference on Environment Management held at Ag during Nov. 30th-1st Dec. 2001. An Exhibition of photo panels was arranged. Plastics and the Environment and copies of ICPE Newsletter were distributed to the participants. Greetech Foundation, New Delhi, organized this conference. Mr. O.P. Ratra made a presentation on **Plastics as Component of Municipal Solid Waste**.

## FORTHCOMING CONFERENCES . . .

### 1. "Meeting Newer Challenges through Innovative Technologies"

The **Indian Plastics Institute (IPI)** is organizing a two-day International Conference during February 14-15, 2002 at Mumbai and one day Conference on February 18, 2002 at Chennai. The Conference will focus Challenges to plastic processing industry, understand the latest in Technology of Raw materials, Machineries, Ancillaries, Automation etc., interact with International experts, initiatives/steps, plastic industry should proactively take to upgrade Production Technology.

For further, details please contact:

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Andheri (E) Mumbai-400 093.  
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### 2. PLASTICS IN HEALTHCARE MEDICAL & PHARMA APPLICATIONS.

The **Society of Plastics Engineers (SPE)**, India Section, will hold a two-day International Conference during February 7-8, 2002 at Mumbai.

The focus of the Conference will be to highlight and promote PLASTICS use in hospitals, surgery, pharma packaging products, in medical, human/hygiene.

Please write/contact for further details:

SPE Secretariat,  
P.B. 11916, Azadnagar,  
Mumbai -400053 (INDIA).  
Tel/Fax: 0091-22-631 3335.  
E-mail: [speindia@roltanet.com](mailto:speindia@roltanet.com) or [aca@born5.vsnl.net.in](mailto:aca@born5.vsnl.net.in)

### 3. "RECYCLING AND REUSE OF MATERIALS"

The **Arab Society of Materials Science (ASMS)** is organizing the 7th Arab International Conference on Materials Science which extends its series of conference that started in 1987. The theme of the 7th Conference is "**Recycling and Reuse of Materials**." It will be held at Palestine Hotel, Alexandria, Egypt, during March 17-20, 2002.

The Scope of the conference includes,

- Recycling in Solid Waste Management
- Technological Aspects in Recycling and Reuse Processes
- Energy from Recycling
- Economic Feasibility of Recycling and Reuse of Materials
- Environmental Impact of Recycling
- Further Opportunities in Recycling
- Case Studies.

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## DO YOU KNOW . . . .

**Greenpeace Just Doesn't Get It: PVC works, And It's Safe**

There they go again. This time it's with a site on their web page that's been dubbed a "PVC Alternatives Database" for those seeking options to the use of vinyl products in construction.

Greenpeace assures us on the site that there "is enormous enthusiasm and interest in PVC alternatives in the construction industry." This seems a tad disingenuous, since Greenpeace later states that more than 50% of global demand for PVC goes to construction. With so much vinyl consumed by that market, one wonders where the groundswell of enthusiasm and interest in alternative materials that Greenpeace cites is coming from.

Greenpeace casts a wide net with the database. The group claims that it is for everyone, from "do-it-yourself enthusiasts to major construction companies... It's highly unlikely, though, that big construction companies-or even little ones-are unaware of PVC alternatives. Somehow, we just can't picture the engineers who built the Petrobras towers in Malaysia turning to Greenpeace to learn that ductile iron, clay or concrete can be used for pipe.

Nor do we expect do-it-yourself remodelers to embrace such alternatives to vinyl flooring as cork, bamboo, or wood, unless they want the esthetics of these materials, will pay the premiums they command, and have the skills necessary to install them.

For professionals and amateurs there are many reasons why PVC is popular. Greenpeace notes two of the most important on the website: low cost and easy installation. One might also mention that it works well. Greenpeace hastens to add, however, that using PVC "has high environmental and human health costs..." And one can imagine what comes next: references to dioxins, phthalates, endocrine disrupters, leachate -all the bugaboos that main-

stream science has dismissed as health threats in PVC products, but which Greenpeace and its cronies cling to as articles of faith.

The database is just one more attempt by Greenpeace to put a happy face on its sour arguments against PVC. It's nothing more than a dilettantish effort to make a case against vinyl where none exists.

**And as is typical with Greenpeace arguments, the web site presents only those parts of a story that suit the group's agenda.** Greenpeace states that "PVC was avoided in the Sydney 2000 Olympic stadium seating and plumbing." Not mentioned was the campaign Greenpeace mounted against PVC use at the Olympics, despite findings by the Australian science group CSIRO that its environmental impact is no greater than that of other materials. Or the U.S.\$ 8 million in added construction costs that the PVC-free design engendered. Greenpeace also fails to note that PVC was extensively used at the Olympic site in communications cable and conduit, drainage pipes, and in 80,000 m<sup>2</sup> of coated fabric.

There must have been a pretty compelling reason for all that PVC use at the Olympics. We think it's because PVC has a demonstrated record of successfully meeting the needs of modern society, one of which is promoting a high quality of life for its members.

The database carries a disclaimer stating it "cannot provide all the answers to specification needs..." Public awareness would be better served if the disclaimer stated instead that the site is for entertainment purpose only. □

*(Source: Editorial by Patrick A. Toensmeier)  
Modern Plastics,  
August 2001 (Page 11)*

**Japan Reduces PET Scrap with Value Reclaim Technologies**

**JAPAN IS FACING A PET WASTE PROBLEM.** Although recent legislation has increased the volume of bottles

collected significantly, from just 5000 tonnes as recently as 1996 to 115,000 tonnes in 2000 (31.8% of production), less than half of the containers collected, 50,890 tonnes to be exact, were processed into recycled products. Fibers are currently the dominant product, while only 10,000-odd tonnes were processed into sheet in 2000, and 2239 tonnes injection molded.

Technologies under development at Yokohama-based Venture Company FTEX Inc., however, may open up a wider variety of applications for recycled PET, including foamed sheet, pipe, and fiber reinforced plastics. Conventional polyolefin processing machinery can be used in all cases.

The first of two technologies under development at FTEX is a reactive extrusion process that combines PET flakes, an epoxy-based coupling agent, and calcium stearate catalyst in a twin-screw compounding extruder to produce branched PET with MFR between 1 and 50 g/10 min (280°C, 2.16 kg) and IV values claimed superior to virgin PET.

FTEX president Takashi Fujimaki says the process' ability to achieve high melt strengths of between 50 and 100 times that of linear PET makes the recycled material, dubbed DJK.

NeOPET, suitable for wide range of processes, including cast film, blown film, injection molding, and low density foamed sheet. Untreated PET flakes normally have an MFR of 50 to 200 and IV of 0.60 to 0.75, limiting their application to fibers, biaxially oriented films, and stretch-blown containers.

FTEX's second new technology is a process for converting PET flakes into unsaturated polyester through reaction with glycol. The AZ process converts PET to a low-viscosity liquid with physical properties said to be at least equal to virgin resin. "In certain cases, there is no need to use a styrene diluent with the recycled material, and standard catalysts and promoters such as methyl ethyl ketone peroxide and cobalt



naphthenate can also be employed," says Fujimaki. □

In a separate application development, Japanese firms Mukai Plastics Consultant Office, Sagami, and Kawasaki Sanko Kasei, Yokohama, have teamed up to develop an easily sharpenable all-plastic pencil containing more than 50% post-consumer recycled PET content.

#### Japan's PET Recycling (tonnes)

	Production	Volume collected	Volume recycled
1998	281,927	47,620	23,909
1999	332,203	75,811	39,900
2000 (est.)	362,000	115,000	50,890

Source: Japan PET Bottle Association □

By STEPHEN MOORE,  
MODERN PLASTICS,  
AUGUST 2001 (Page:39)

#### Plastic Cans

**Metal cans have been used since 1810 to store food and other products. In all that time they have remained fundamentally unchanged. Today's plastics have superior qualities for many applications, but the problems associated with moulding cans from polymers such as PET have proved impossible to overcome - until now!**

The Plastic Can Company has revolutionized the way lever lid containers can be produced. Low-cost, high volume cans in PET, HDPE and PP now become viable for the first time.

The problems associated with off-site production are well documented, but the cost of setting up an in-house can-making facility used to be prohibitive.

Now, with our revolutionary technology, the Plastic Can Company Plc is able to deliver a very economical, compact can-manufacturing plant. This includes a single stretch blow moulding machine, lid moulding machine, ancillary equipment and tooling, and is able to produce, for example, 8 million 750ml containers per annum. It offers manufacturers the option to customize the design and shape of their containers, and to alternate pro-

duction between different sizes in a few minutes.

The Plastic Can Company Limited's patented technology renders obsolete the complex and time-consuming two-part manufacturing process used in the past. No more stock control problems. No more inefficient transportation and storage of empty containers.

A successful recycling programme depends not only on collecting our empties - recyclables must also be made into products that we want to buy.

Thanks to the continued investments and innovations of manufacturers and recyclers, there is no shortage of excellent new uses for recovered PET. □

#### Staple Fibre

75% of the recovered European PET produces polyester fibres. Reprocessed flakes are melted and spun into strands. The length and thickness of the fibre determines the products made.

Fibre lengths from 5mm to 150mm are termed "staple grades" and are the largest single market. Larger diameter fibres fill anoraks, sleeping bags and soft toys. Recycled PET is also used to spin smaller diameter fibres. These can be woven into fleece fabrics for products

such as jackets and scarves. Such fabrics can contain over 95% and up to 100% recycled content.

Major outdoor clothing companies already recognize the benefits of these "recycled garments" and are introducing new ranges. A "recycled" fleece jacket uses 25 PET bottles!

Polyester fibres are being engineered to provide the same qualities as upholstery foams. 35% recycled content has been introduced to these advanced hollow "conjugated" polyester fibres. □

(Source: [www.canooet.com](http://www.canooet.com))

#### Epoxy that doesn't Stick to the rules

Researchers at Sandia National Laboratories have developed a novel epoxy adhesive that can lose its stickiness at high temperature, and then rebond components when the temperature falls. The scientists claim that this is the first adhesive with the strong bonding characteristics of an epoxy to exhibit this capability of melting and rebonding. "Our approach to a removable adhesive relies on the use of a reversible chemistry that breaks apart the adhesive at elevated temperatures, resulting in low adhesive molecular weight and low bond strength", explains team leader Jim Aubert.

#### End User Markets for Recycled PET (Europe)

End user market	Total market size in Ktons (includes virgin)		% Penetration with RPET		Tonnage in Ktons used in
	2000	2002	2000	2002	
Year	2000	2002	2000	2002	2000
Fibre-staple	474	540	15.0	35	71.0
Food contact containers	1111	1311	4.5	25	50.0
Non food contact containers	217	232	3.2	10	7.0
A-Sheet	125	18	14.4	20	18.0
Strapping	37	57	21.6	50	8.0
Injection Molding	94	100	5.3	10	5.0
Polyols	21	30	9.6	25	2.0
Foams					
Chemicals recycling					15.0
<b>Totals</b>	<b>2079</b>	<b>2450</b>	<b>8.5</b>	<b>25</b>	<b>176</b>



The unheated adhesive looks like an elastic band, and can be prepared in any dimensions, allowing it to be cut to size for accurate bonding of shaped components. The initial bond is made by applying the adhesive to one of the surfaces to be joined, and melting it. It is then brought in contact with the other surface, and cured between room temperature and 60°C. To 'undo' the bond, the adhesive is simply heated to between 90-130°C depending on the formulation, at which temperature it liquefies, releasing the surfaces, which can be pulled apart with minimal force. The adhesive can then rebond the components by setting at between 20-60°C.

The new adhesive is ideal for versatile assembly of components, and enables much simpler upgrading or repair of bonded parts, as well as simpler dismantling and recycling. 'Normally, no thought is given to disassembly after bonding parts with an epoxy', says Aubert. 'Yet disassembly is becoming an increasingly important aspect of manufacturing as we become more concerned with the cradle-to-grave aspect of materials of environmental and economic reasons.'

The adhesive has already been applied successfully to a number of metals, as well as to some foams and polymers. Applications could be found in any systems that need periodic dismantling for inspection or upgrading with new technology.

The work on the epoxy adhesive is part of a larger ongoing programme of research in Sandia's Materials and Process Sciences Center. Researchers have previously developed removable encapsulants, and are currently working on removable conformal coatings for circuit boards.

### Sticky Solution for Plastic Car Parts

Making sizeable car parts such as bumpers with plastics provides automotive manufacturers with significant benefits, including increased fuel economy, reduced manufacturing costs and opportunities for recycling. Until now, getting such components to form a strong adhesive bond to the frame of the vehicle has been a major challenge. Rebecca Cain

from the University of Warwick and Dr. Felicity Guild from the University of Bristol reveal how a simple plasma pretreatment process has been developed that solves this problem.

Increased use of low-density materials such as polymers and polymer composites is one way of developing the light-weight vehicles of the future, to achieve the forthcoming strict legislation on emissions and recyclability. Of the commodity polymers, polypropylene is by far the most attractive for the automotive industry. It not only fulfils these requirements but it is also inexpensive. Additionally, polypropylene can be used as a glass or mineral filled composite, which may be used for semi-structural applications.

Automotive manufacturers who wish to 'pursue this attractive material must consider appropriate methods of joining panels. Mechanical fastening is the traditional technique employed. However, not only do the fixings add weight to the assembly, they can also be damaging, especially for composites given that stress concentrations can promote premature failure. Therefore, adhesive bonding has become the most practical alternative.

A major problem is that polypropylene (along with other polyolefins) has a non-polar surface chemistry, which means the wetting characteristics of components made from this material are poor. Ultimately, this will result in poor adhesion of paints, coatings or adhesive bonding products. This problem has been overcome in the majority of instances by treating the surface of the substrate in order to alter the surface chemistry. Numerous methods have been used to increase the number of oxygen groups on the surface, including chemical treatment, corona discharge and plasma techniques. These techniques produce a variety of changes at the surface, including cleaning, removal of low molecular weight fractions, cross-linking and oxidation.

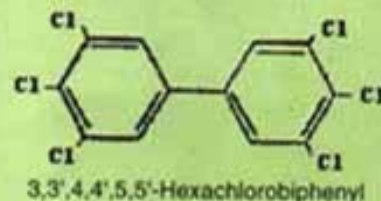
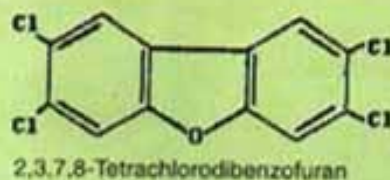
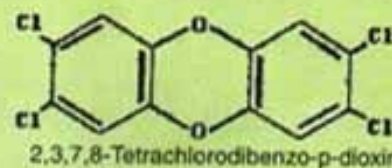
Owing to polypropylene's extensive use in films and flat sheets, certain techniques such as flame and corona have been favoured, despite both having

problems of heterogeneous or patchy treatment across a surface. However, for complex 3-D automotive shapes such as bumpers, these methods are less useful, although flame treatment can be easily automated. □

(Source: Materials World, November 2001 (Page: 10, 12)

### The Truth About Dioxin - Revelations...

#### What is Dioxin?



- 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD)
- Family of structurally & chemically related PCDD's, PCDF's & PCB's
- Out of 419 dioxin related compounds, only 30 considered to have significant toxicity
- Unwanted by-products formed during elevated thermal processing of chlorine containing organic substances

(CAS No: 828-00-2)

Source: USEPA

#### How harmful is Dioxin

- Dioxins are generally present at very low concentrations in all foods, but are specially found in fatty foods such as cow's milk
- WHO permits/recommends Tolerable Daily Intake (TDI) of 10 pg/kg body wt/day TCDD
- Need to avoid TDI > 10...
  - Skin diseases & discoloration



- Liver damage
- Cancer
- Weakened immune responses in offspring

Source: Federal dietary Guidelines  
UK Committee on Toxicity of  
Chemicals in Food

#### Sources of Dioxin

"If you really mean ZERO, then stop

- all heating with fossil fuels
- all traffic
- all factories

Highest amount of dioxins found in woods, not in industrial or heavy traffic areas"

Source: CHLOROPHILES

#### Because . . .

Dioxin is present in nature w/o human intervention

- Barks of redwoods
- Natural fires
- Wood rotting fungi
- Million year old clay layers
- Mushrooms
- Cow's milk

And also from unexpected sources...

Source: CHLOROPHILES

#### Like . . .

- Cotton garments . . . . . upto 1000 pph
- Domestic sludge & Composting (To be checked)
- Dry cleaning residues
- Household dust
- Recycling emissions\*  
– CU (2280)/AOI (35) / Paper (14) / Steel (6)
- Production emissions\*  
– Glass (8.7) / Steel (8.4)
- Any material incinerated / burned (wood/paper etc...) will emit dioxins

\*Figures expressed in microgram (I-TEQ)/ton material

And the list continues . . .

Source: CHLOROPHILES

#### Rank order

Process	Dioxin (gram TEQ)
Backyard trash burning	1125
Municipal waste incineration	1100
Landfill fires	1050
Hospital waste incineration	461
Metal smelting	293
Forest fires	208
Wood, coal, vehicles	198
Cement kilns	171
Iron ore sintering	25
Swedge sludge incineration	15

Source: USEPA

#### Rank order

Process	PCDDF emission (kg/yr)
Waste incineration	1130
Cement kilns	680
Biomass combustion	350
Ferrous metal production	350
Medical waste incineration	84
Sec. Copper smelting	78
Leaded fuel combustion	11
Unleaded fuel combustion	1

#### How to destroy Dioxins?

- Incinerators is the best available answer
- Process requires important operating parameters
  - High temperature of over 850-1200 deg C
  - Dedicated Dioxin Combustion Zone
  - Scrubbing chamber with pollutant absorbing chemical liners

With modern incinerators dioxin is not an issue .....

#### ADVANCED COMPOSITES MISSION Modular Toilets for Railways

The Advanced Composites Mission of Technology Information Forecasting and Assessment Council (TIFAC) of Department of Science and Technology, Govt. of India has been a national initiative towards development of composite products and applications. The Mission

has developed a basket of novel composite products for railway applications viz. Fibre Reinforced Plastic (FRP) gearcase for locomotives, jute-coir boards as berth backing material, FRP main door for coaches, FRP sleepers for girder bridges and radiator cooling FRP fan for diesel locomotives...

The project on 'Development of FRP Modular Toilet Unit for Railways', taken up under the Advanced Composites Mission programme, has been a collaborative effort by a multi-agency task force involving the Industrial Design Centre and Department of Aerospace Engineering of IIT-Bombay, RDSO-Lucknow, RCF-Kapurthala, ICF-Chennai, and Carriage Repair Workshop of Western Railway-Mumbai.

The toilet unit consists of four parts: the flooring trough, two L-shaped side-walls and roof. All the four are fastened together with self-tightening screws at the mating faces and their assembling is done inside the coach. The salient features are:

- Pultruded FRP frame on all four sides of the door.
- Proper ventilation in the toilet on the window side-wall and the lower part of the door.
- Improve anti-skid PVC sheet with anti-abrasion properties for the flooring.
- Concealed plumbing.
- FRP door for toilet with sandwich construction.

The modular toilet unit with advanced features has evoked keen interest in the Railways for improved aesthetics, easy maintainability and longer life. On initial success of the prototypes, the Railways plan to induct a considerable number of FRP toilet units for large-scale field trials across the country.

Four FRP modular toilet units have been fitted into an AC-II tier coach of Mumbai-Delhi Rajdhani Express.



# इतना भी खतरनाक नहीं है प्लास्टिक

संजय सिंह

**सुई दिल्ली:** प्लास्टिक पर्यावरण के लिए खतरनाक खाद्य है, यह लोग लोगों के दिमाग पर इस प्रकार का गहरा है कि इसके पशु-पक्षी-पतंग के अलावा और कुछ जाना ही नहीं जाता। प्लास्टिक के कुछ पराणों भी हो सकते हैं, यह बात लोगों के मनो नहीं उठती है। लेकिन सच्यार्थ यह है कि प्लास्टिक पर्यावरण के लिए खतरनाक भी खतरनाक नहीं है, बिलकुल बड़ा-बड़ाका उन्ही पेश किया जाता है। उत्पादन में जुड़ी होकर प्रक्रिया का- काचों कागदों से लेकर साधन बनाए जाने तक और परिवहन, उपयोग और उसे फेंक जाने तक- पर्यावरण पर कुछ-न-कुछ असर पड़ता ही है।

कहा जाता है कि विश्व के तेल या हाइड्रोकार्बन के संचयन के अधिकतम हिस्से का उपयोग प्लास्टिक के लिए किया जाता है। लेकिन इकोकाउ इतनी अलग है। प्लास्टिक के लिए 4 प्रतिशत से भी कम हाइड्रोकार्बन के संचयन का उपयोग होता है। लगभग 90 प्रतिशत हाइड्रोकार्बन तो पेट्रोलियम, जहाँ उत्पादन और लागत कम है वहाँ होता है।

प्लास्टिक और प्लास्टिक को बेहतर चीथें और भूमि के लिए हार्जिनाकार नहीं होती। कार्बन में पेट्रोलियम की परत में भूमिगत का बचपन हो होता है। यहाँ तक कि चीथें को एक के लिए काफी समय से पॉलीथीन की परत बिनाई जाती रही है। मिट्टी को चीथें एक घात के रूप में पेट्रोलियम बिनाये से मिट्टी का बहाव रोका जा सकता है। यौतलभ है कि चीथें में टन लाख टन पॉलीथीन का उपयोग केवल चीथें के लिए किया जाता है।

प्लास्टिक का तो का-प्रतिशत पुनर्चक्रण हो सकता है। चीथिक पुनर्चक्रण के जरिये चूने-चमका, चारों और चाय आदि बनाए जा सकते हैं। इथियन पैरा पर प्लास्टिक इन एन्वायरमेंट के वैज्ञानिक डॉ. ए.एन. भट्ट का कहना है कि प्लास्टिक को जड़ोत्प और हार्जिना उपयोग के लिए अनुचित बहाव हास्यकार है।

दुनिया था में प्लास्टिक का उपयोग अधिकतम देखाएक को चीथें, खाद्य चर्चों और टकड़ों के पैकेजिंग के लिए किया जाता है। प्रकृतिक रंग को बेहतर पॉलीथीन से बनाई जाती है और इनमें डिटेरिपिय हाइड्रोकार्बन

कोई असर ही नहीं है। इतना नहीं किया जाता।

आजकल पैकेजिंग के लिए प्लास्टिक को खाद्य परपत्रण चीथें कापक, कागद, चूट और चूट आदि के उपयोग को काफी प्रोत्साहन दिया जा रहा है, लेकिन इसका दुसा पशु भी है कि इसी उपयोगका पर काफी दखल पड़ेगा।

पैकेजिंग का बचन 300 प्रतिशत तक बढ़ जाएगा और इसी अनुसंधान में उत्पादन के लिए जहाँ को खराब भी वर्गी। पैकेजिंग को लगान में भी 210 प्रतिशत तक को बढ़ाती हो सकती है।

चमार और चाय की उपत्ती को निर्माण प्रक्रिया में बहुत अधिक रक्षण एवं होते हैं और बहिष्कार या एन्वायरमेंट को संचयन भी बहुत बढ़ी है। लेकिन सबसे बड़ी समस्या तो लुगटो की है क्योंकि वेदु बहाव चीथें है और इसका बहाव गलत से लुगटो ही है।

चूट को उत्पादन प्रक्रिया भी पर्यावरण के अनुकूल नहीं है। इसके उत्पादन में कार्बोसिक अम्ल व अन्य रासायनों का इस्तेमाल किया जाता है और पूरी प्रक्रिया के दौरान काफी मात्रा में विषेन गैस निकलती है जो वायु प्रदूषण के लिए विषेदक है। चूट उपत्ती के बिचन के लिए कार्बोसिक अम्लों का उपयोग किया जाता है और उत्पादन के बाद वे कार्बोसिक एन्वायरमेंट फेंक दिए जाते हैं। यह कार्बोसिक प्लास्टिक उपत्ती से बनी अधिक बहाव होता है।

इसके अलावा हाल के सौरों में यह पाया गया है कि चूट के उत्पाद और लक्षण तक के संकेत में उन्ही हो तो इन्वेन्शन कीती सच्यार्थ भी वेदु हो सकती है।

प्लास्टिक कार्बोडिडेकल तो नहीं है लेकिन देखा भी नहीं है कि इसे का किया जाय संभव हो नहीं है। इसे पैदा का सकता है, अर्थात् सचन किया जा सकता है और भूमि को भरा में वे बहुत ही कम बहाव लेते हैं। प्लास्टिक को लड़ कोष और चूट को कार्बोडिडेकल नहीं होते लेकिन फिर इसी बहाव से इन चीथें पर एक नहीं लाया जा सकता। कार्बोडिडेकल व इनके के कापक प्लास्टिक को कां ठीके में रह किया जा सकता है। इसके अलावा प्लास्टिक का पुनर्चक्रण करके इसे टैकल इन्वेन्शन में लाया जा सकता है।

**खतरनाक नहीं है प्लास्टिक**

- प्लास्टिक के लिए 4 प्रतिशत से भी कम हाइड्रोकार्बन संचयन का इस्तेमाल होता है।
- पेट्रोलियम की परत में भूमि का बचपन होता है।
- प्लास्टिक कार्बोडिडेकल नहीं है लेकिन इसे पैदा किया जा सकता है और इसका पुनर्चक्रण संभव है।

Source :- Navbharat Times, Dec. 25, 2000

**प्लास्टिक प्रदूषण का सवाल**

**इसका मत है कि प्लास्टिक पैकेजिंग का इस्तेमाल करने वाली कंपनियों को उपयोग के बाद फेंकी गई खाली पैकेजिंग को रिवाइसिंग का बिन्ना लेना चाहिए।**

पॉलीथीन को बेहतर के अर्थों में विश्व का एक ही में बनी कार्बोसिक देखा को नहीं है, लेकिन प्लास्टिक को खाली बेकार, फेंकी और बर्बादी में छोड़ने वाले पर्यावरण प्रदूषण को और खराब होती का बचन नहीं बहा बर्बाद करतीही था है कि 21 चीथें में छोड़े बहा प्रदूषण मिट्टी को उन्ही बर्बाद और कार्बोसिक लेन के लिए खराब हो कार्बोसिक है जिसके कि पॉलीथीन चीथें में छोड़े बहा प्रदूषण है। अकार्बन विनाय कार, चीथन चीथें और बहाव में लेना लका और एक चीथन का प्लास्टिक को चीथें में का रहे हैं। एक विश्व की प्लास्टिक बर्बाद सचन में का रहे हैं। लेकिन कार्बोसिक से देन में रिवाइसिंग इनकी बहा को बर्बाद चीथें नहीं है। लेन सचन के चीथें और, का बर्बाद या और प्लेन सचन का बर्बाद चीथें और फेंक बेकारही पशु वका आते हैं जिनसे सचन को बर्बादही का रही है। सचन है कि इनके देन में देती कार्बोसिक चीथें नहीं। एन्वा का है कि इनकी सचन उन चीथें में छोड़े बर्बाद छोड़े को प्लास्टिक पैकेजिंग के बर्बाद उपकेसकों को लुगटो हैं। चीथें, चीथे चीथें बर्बाद करके, जो लेन सचन एक "दुब देन को" बहाव को लेना आते हैं, इन विश्व में रिवाइसिंग उन्ही करे हैं। वे दुर्घटना का बर्बाद है कि प्लास्टिक को बेकार खाली छोड़े हो उन्ही सचन पुनर्चक्रण या लुगटो करे।

**प्रतिशब्दकोष / समिल स्मेलन मिगल कार्ट एरोसिएशन के महासचिव अक्वीस हर्मा का मत है कि पर्यावरण सहा निर्लेक कार्बोटी रोष को नहीं, गुरु सचन की जिम्मेदारी है।**

अकार्बन का पुनर्चक्रण नहीं बहा नहीं है। चीथन लेन चीथें खाली चूट बर्बाद बर्बाद करके लेन चीथें बर्बाद या खाली बेकार को एक बहाव करने और उन्ही रिवाइसिंग करने को सचन में बर्बाद भी दे रही है। लेकिन वेदु सचन यह है कि यह बहाव उन्ही सचन में नहीं, बिलकुल लेन सचन में है। का उन्ही लेन चीथें और सचन के चर्चों में लेन सचन को ही देन सचन के प्लास्टिक चूट को उन्ही सचन का बहाव है, लेकिन इन सचन के उन्ही सचन का बहाव उन्ही सचन में उन्ही सचन को भी बहाव उन्ही देन कि का प्लास्टिक का रिवाइसिंग पुनर्चक्रण बर्बाद खाली पर चीथें और उन्ही एन्वा-उन्ही सचन। इसके अलावा सचन को भी देती रिवाइसिंग इनकी रिवाइसिंग के लिए अधिकतम सचन देन देना। यहाँ एक मिगल कार्ट इनकी का सचन है, इन सचन का सचन ही सचन-उन्ही के उन्ही सचन देन हैं। कार्बोसिक के अकार्बन और चूटो सचन को कार्बोसिक सचन को बहाव में उन्ही सचन को बर्बाद करके लेन चीथें बर्बाद करे हैं। का दुर्घटना सचन को सचन बहाव खराब खाली है और प्लेन सचन को बहाव लेने खाली है। इन्ही में, मिगल इनकी लेन चीथें सचन खाली का सचन। पर्यावरण सहा गुरु सचन का बर्बाद है और सचन, उपकेसक और सचन को लेन-कुकरा को देन सचन को बहाव देना।

Source :- Navbharat Times, Dec. 17, 2001

# Power from garbage gets green signal

Chetan Chohan  
New Delhi, November 26

IT is called the Municipal Corporation of Delhi's second experimental waste-to-energy plant. The Governor Vajra Kapur last week approved setting up of a garbage treatment plant which will produce electricity.

The first plant of the corporation at Mayapuri in 1986 had failed to generate electricity. It had been found that no electricity was being produced by burning of the solid waste. Instead, more fuel was being burnt to generate power causing air pollution.

The technology did not work and the plant was closed down. At present there are no buyers for it.

The same mistake will not be allowed to be repeated, or so at least claims the former Transport Minister Rajender Gupta, who is also promoter of the new project.

"The plant producing power in Australia does not generate heat by burning the garbage. It gases the solid waste disposed to provide energy to turbines to generate power," he said.

To be built at a whopping cost of over Rs 200 crore on the basis of Solid Waste Treatment (SOT), the plant will generate 25 megawatt (MW) of power. The plant will consume 1,000 tonnes of garbage every day of the total 2,000 tonnes of garbage, which Delhi generates.

"Six such plants can be an answer to garbage management," Gupta said.

As per the technology being used in this plant first the waste is processed in a water steamer and treated with chemicals to burn the bacteria. The processed garbage is then sent to primary gasifier which generates gas under heavy pressure for the power plant. "The gas not burnt is utilised for generating power," he stated.

The biggest advantage of this technology is that there is no need to segregate the plastic from the garbage as required in compost plants. The residue after the gasification process can be used as manure. "In this process there is no waste matter left and the plant does not cause any air pollution," said an official.

According to an official at the office of the Lieutenant Governor, the project was cleared last Thursday at a meeting with Municipal Corporation commissioner K P Aggarwal and other officials. "It is a good project and the L-G had accepted it in principle. The modalities are being worked out and it will take sometime before the final agreement is signed," an official said.

The official added the Municipal Corporation of Delhi has demarcated a 30-acre plot in Gurgaon for setting up the plant. "If everything goes as planned the plant will start functioning by 2003," Rajender Gupta stated.

Source :- Hindustan Times, Nov. 27, 2001



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