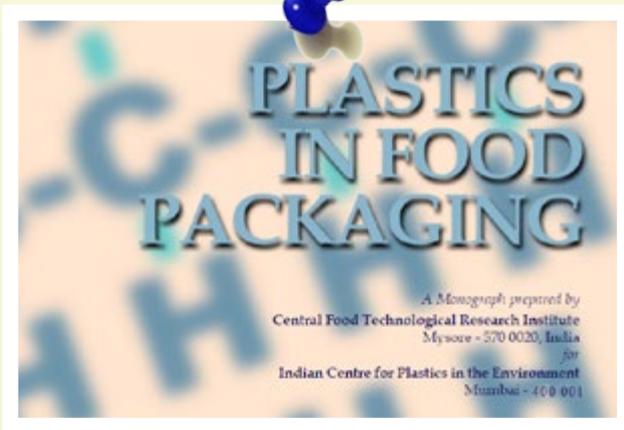


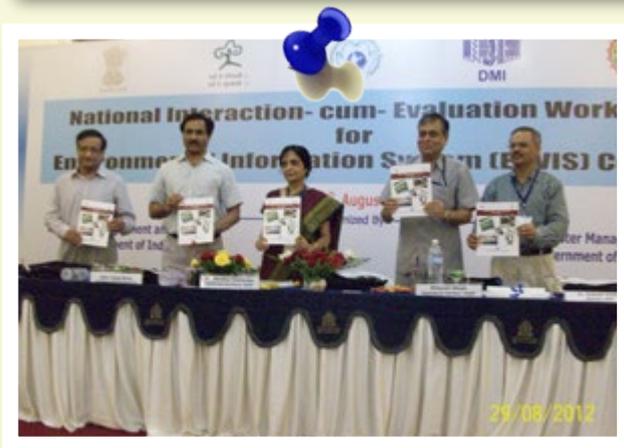
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Mysore**



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Envis Eco-Echoes

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THE ENVIRONMENT

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

Head of Institution

Mr. K. G. Ramanathan

President - GC



Other Office Bearers



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Member - EC



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Hon. Treasurer /

Member - EC



Mr. Vijay Merchant

NGO - Project

Member - GC

ICPE-ENVIS Co-ordinator

Mr. T. K. Bandopadhyay

Sr. Technical Manager

ICPE-ENVIS Team

Mr. Sudheer Khurana

Sr. Programme Officer

Mr. P. Radhakrishnan

Information Officer

Editorial



The uses of plastics have revolutionized the field of medicine, making patients safer and procedures much simpler. Plastics in medicine have improved the quality of life for senior citizens and for those injured in accidents. Today's artificial knees and hips rely on plastics to provide people with pain free movement and trouble-free joints. Plastics have played an important role in the Polio Eradication programme in India. It is the plastic containers and the insulation system around it that helped the polio vaccine to remain at the desired temperature levels, even when delivered at the remote villages across the country. Plastics packaging is particularly suitable for medical applications, thanks to their exceptional barrier properties, light weight, low cost and durability.

It is amply clear that plastics do not cause any health hazard. Plastics do not cause any environmental hazard either. Plastics consume least amount of energy; emit least amount of volatile organic compounds during its production and leave lesser carbon footprint on the earth compared to the alternative materials. Plastics used in medical care must not be thrown out into open garbage bins. The contaminated biomedical wastes including plastics are required to be disinfected by different processes and then disposed of strictly as per existing Biomedical Waste Management Rules.

Sections of media and those who are not well informed end up blaming plastics for problems related to solid waste management. We should examine our poor littering habits and act with better civic sense. We should also improve our SWM infrastructure. If we keep our surroundings clean, if we follow the Plastic Waste Management rules, plastics will continue to be our friend in need and friend indeed... Replacing pain and agony with Comfort, Convenience and Happiness. ICPE is coming out with a short film focusing the theme - Plastics have emerged as our lifeline.

Subscription Information:

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

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

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Editor

Mr. T. K. Bandopadhyay

Plastics in Food Packaging

A Report

Introduction

In tune with the changes to suit the modern needs, the use of plastics in daily life is enormously significant. Plastics have made deep inroads in all form of the activities of the society. It is specially so, in the field of food handling system.

Starting from purchase of seeds, application of fertilizers, irrigation activity, disease resistance programme, storage methods and ultimately distribution mode to reach the consumer, the role of plastic is predominant in each and every activity.

The use of plastics in these activities is on the increase because of its convenience and the economic benefits thereof.

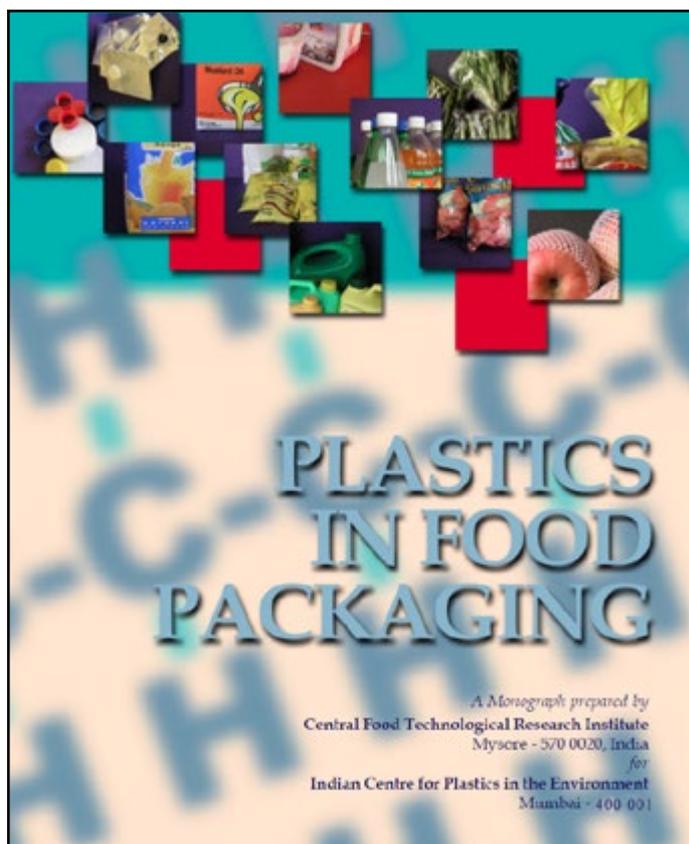
The following chain of activities and the thrust of plastics replacing the traditional relevant materials could be seen.

Seeds in small cloth bags or jute bags	→	Seeds in plastic pouches
Irrigation activity with GI pipes	→	Irrigation activity with PVC pipes
Spray of insecticides in metal sprayers	→	Sprayers are made of plastic materials
Grain harvesting and drying activity	→	Drying activity using plastic sheets
Grain storage in bins, jute bags	→	Grain storage in PWS
Trading of grains in jute bags	→	Trading of grains in PWS
Commercial activity in jute bags	→	Commercial activity in PWS
Retail trading at consumer end using jute bags / paper bags	→	Retail trading using plastic pouches

In view of this visible and significant change in the entire process of grain handling, it was felt desirable to scientifically assess the merits and demerits of using plastics for bulk packaging of common commodities that are conventionally packaged in jute sacks.

The Indian Center for Plastics in the Environment, Mumbai thought about the above and assigned the responsibilities to the Central Food Technological Research Institute, Mysore to carry out the detailed study on the use of plastic woven sacks for packaging wheat, paddy, rice and sugar.

Accordingly, the Institute undertook a planned detailed study and the enclosed are the outcome of the study.



Executive Summary

M/s Indian Centre for Plastics in the Environment, Mumbai sponsored the project. The sponsor supplied the plastic woven sacks as well as jute sacks required for the studies.

Wheat, Paddy, Rice and Sugar were stored in Jute sacks, High-density polyethylene (HDPE) and Polypropylene (PP) woven sacks for six months to study the effect of sacks on the quality of packaged food.

The following are important findings of the study.

1. WHEAT

- No significant difference was observed in any of the physico-chemical characteristics of wheat on six months storage in the three different packaging materials.

2. PADDY AND RICE

- Samples could not be stored for more than eight days under accelerated conditions (380C, 90/RH).
- The moisture of the grains during six months of storage under ambient condition remained same (11-12%) in all three types of sacks.
- Hydration behaviour at room temperature was same in rice packed in all three types of sacks.
- Swelling and solubility of rice flour made from packaged and stored rice remained almost same for all types of sacks.

3. SUGAR

- Sugar was stored only under ambient condition in all three packaging materials.
- No significant differences were observed between the Jute, HDPE and PP sacks with respect to moisture content, colour and odour.
- The overall quality of the sugar packed in plastic woven sacks was not adversely affected during storage.

4. DNA FINGERPRINTING

- The integrity of the genetic material of wheat, rice and paddy was evaluated by studying the integrity of a marker (a small piece of DNA associated with a certain trait) such as the housekeeping gene before and after storage.
- Positive amplification was observed for the 18S rDNA of rice, wheat and paddy stored in Jute, HDPE and PP for six months.
- The possibility of any free radicals or monomers from the plastic materials did not show any direct effect in the invitro studies.
- Amplification experiments of the 18S rDNA, glutenin / sucrose phosphate synthase genes did not show any detectable changes within the period of the study.
- These marker genes were detected in the grains stored for six months in Jute, HDPE and PP sacks.

Executive Summary

5. INFESTATION ASPECTS

- PP and HDPE woven sacks were superior in the prevention of insect penetration compared to Jute sacks.
- Fungal spoilage was very fast and visible fungal growth observed when paddy and rice were stored at accelerated conditions.
- No significant increase in the fungal population in all the three packaging materials for the rice grains when stored under room temperature.
- Fungal populations decreased significantly in case of wheat stored under room temperature.

6. GLOBAL MIGRATION

- Global migration values for HDPE and PP woven sacks tested with different food simulants were well below the specified maximum limits as per BIS specifications.
- WVTR of unlined HDPE and PP woven sacks were high as compared to Jute sacks.
- Breathability of HDPE and PP woven sacks were comparable to that of Jute sacks.
- Higher value of coefficient of friction in PP woven sacks will help in stacking the sacks.

7. ODOUR PICK UP BY THE STORED FOOD GRAINS

- Electronic nose could be used for detection of changes in odor occurring during storage of packaged foods.
- Odour of packaged food changes on storage, but these changes are not caused by the packaging material.
- Paddy, Rice and Sugar did not pick up any

significant odour from the packaging films up to six months of storage under ambient conditions.

- Wheat was found to have slight odour pick up from the packaging material at the end of six months of storage.

8. OVERALL CONCLUSIONS

- The study conducted under this project has shown that HDPE and PP woven sacks can be used for bulk packaging of paddy, rice, wheat and sugar.

Paddy, rice, wheat and sugar packaged in HDPE and PP woven sacks and stored at ambient condition for six months did not undergo any significant changes in physico-chemical characteristics.

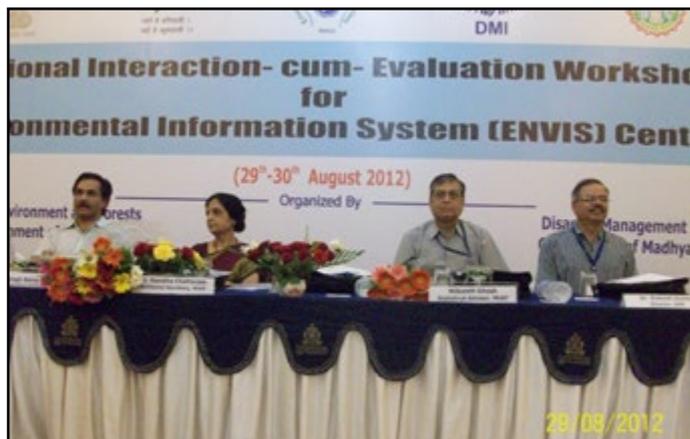


Bulk Storage of Paddy & rice in different types of Sacks

National Interaction Cum Evaluation Workshop for Envis Centres from 29th - 30th August, 2012 Bhopal, Madhya Pradesh

National Interaction- Cum - Evaluation Workshop for Envis Centres organised by ENVIS Secretariat of MoEF, was held at the Disaster Management Institute (DMI), Bhopal, Madhya Pradesh during August 29th - 30th, 2012.

Mr. T. K. Bandopadhyay, Coordinator of ICPE ENVIS Centre and Mr. Sudheer Khurana, Sr. Programme Officer attended the Workshop. ICPE ENVIS Centre has been selected as one of the 36 Centres in the country to be a part of Government's ENVIS activity.



Somaiya College, Mumbai 5th September, 2012

ICPE participated in a Student Programme in Somaiya College, Mumbai and sponsored a Inter College Debate programme during the occasion. Students selected their subject from following topics:

- **Plastics - Benefits, Issues and Solutions**
- **Plastics Waste Management – Responsibilities of Stake Holders**
- **Plastics Recycling Methods – Options**

Prizes were sponsored by ICPE to the best teams.

Sh. T. K. Bandopadhyay made a brief presentation to the students and teachers of the College and ICPE short film – “Listen... Plastics have something to say”, was screened. All appreciated the clarification on various myths on plastics.



Sophia College, Mumbai 3rd August, 2012

An Awareness Workshop was organised on the 3rd August, 2012 for the Science stream students of Sophia College to increase their awareness with regards to the environment and plastics. Sh. T. K. Bandopadhyay made a presentation and ICPE short film was screened. Head of Chemistry Department and other teachers also were present along with the students. After the programme, the Chemistry Department Head suggested that such programme

should be organised for students of all streams.

ICPE plans for scaling up of the School Programme Activity with the help of outside professional service. Accordingly ICPE sought the assistance from Stree Mukti Sangathana in this regard. Ms. Kalpana Andhare, on behalf of Stree Mukti Sangathana (SMS) made a presentation on the School Programme the organisation conducts on behalf of an Association.



Sanjay Gandhi National Park, Mumbai 3rd August, 2012

PLASTINDIA FOUNDATION has arranged to distribute around 75 benches made of Recycled Plastics Lumber to Sanjay Gandhi National Park, Borivili, Mumbai as a part of mass awareness campaign that plastics waste can be recycled in to useful products.

ICPE team had visited the Park Authorities to seek their permission for displaying awareness panels on anti-littering messages at appropriate spots of the park. While giving on – principle permission, the Park authorities have requested for:

- **Making arrangement for a compactor / bailing machine**



- **Making arrangement for large size waste collection bags**
- **Contacting an NGO which will take away the compacted plastics waste from the National Park for supplying to recyclers**

SGNP will provide space for operating the compactor in the park. They will also provide free electricity for running the compactor machine. ICPE is making arrangement for a suitable compactor / shredder.

National Park authorities agreed to give necessary permission to put up some Display Boards carrying some environmental messages. It was decided to make some slogans for approval by the Park Authorities.



Seminar on Plastics Waste Management Chennai, 14th July, 2012



A seminar was organised by Tamil Nadu Plastics Manufacturing Association (TAPMA) on Municipal Solid Waste Management with special emphasis on Plastics Waste Management on the 14th July at Chennai. Shri Vijay Merchant of ICPE made a presentation in the seminar. It was observed that now there are stake holders who are ready for pay for the Waste Management activities.

Seminar on Use of Plastics Waste for Construction of Road organised by Indian Plastics Federation Kolkata, 25th July, 2012

A Seminar was organised by IPF at Kolkata on 25th July, 2012 at Indian Chamber of Commerce Hall, to spread the concept of the use of Plastics Waste for the construction of Asphalt Road. Minister in Charge of Urban Development and Municipal affairs Government of West Bengal - Mr. Firhad Hakim (who is also the chairman of Kolkata Metropolitan Development Authority) inaugurated the Seminar. The seminar was attended by Chairmen and officials of Kolkata Municipality Corporation and about 10 Municipality Corporations around Kolkata. The Chairman of Kalyani Municipality, where a road was constructed using plastics waste in 2009 spoke and confirmed that the condition of the road after

3 years was still good. Mr. T. K. Bandopadhyay of ICPE made a presentation on the subject narrating the trials conducted in Kalyani, Ashok Nagar and Chandan Nagar under ICPE technical assistance.

The Urban Development Minister of West Bengal announced that at least 6 more Municipalities would construct such roads in the next phase. He also announced that State PWD would look into the possibility of including this matter in its 'Schedule', so that no separate permission is required to lay such roads in the State. Each Municipality would install 'shredding machine' to supply the input (shredded plastics waste).



DATA SHEET

Emissions During Processing of Plastics

Volatile Organic Compounds(VOCs)
&
Hazardous Air Polutants(HAPs) (ppm)

Polymer (Processed at temp C)	VOC as per ASTM D-3686 (GC)	Formic Acid, Acetic Acid, Acetaldehyde (HPLC)	Formaldehyde (UV Spectrophotometry)	Hydrochloric acid (Calorimetry)
LDPE (170-205 C) Extrusion / Injection Moulding	Nil	Nil	<1	Nil
LLDPE (180-240 C) Extrusion / Injection Moulding	Nil	Nil	<1	Nil
HDPE (210-245 C) Extrusion / Injection Moulding	Nil	Nil	<1	Nil
PP (210-270 C) Extrusion / Injection Moulding	<1	Nil	<1	Nil
PVC (150-250 C) Extrusion / Injection Moulding	Nil	Nil	Nil	Nil
PS (190-270 C) Extrusion / Injection Moulding	<1	Nil	<1	Nil

PROCESSING OF PLASTICS IS SAFE UNDER STANDARD PROCESSING CONDITIONS.

Threshold Limit For Toxic Air Pollutants In Industrial Environment

S.No.	Toxic Pollutants	PPM Level
1.	Acetaldehyde	100
2.	Benzene	10
3.	Acetone	5
4.	Acetic Acid	10
5.	Formic Acid	5
6.	Styrene	100
7.	Formaldehyde	2
8.	Hydrochloric Acid	5
9.	Methanol / Ethanol	5

*Source : 1) American Conference of Gove. Industrial Hygienists (ACGIH)
2) Fedral Occupational Safety & Health Administration (OSHA)

*Source : Shriram Institute for Industrial Research, Delhi

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