ICPE
INDIAN CENTRE FOR PLASTICS IN THE ENVIRONMENT

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ECO-Echoes

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ICPE

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Editorial

Indian Centre for Plastics in the Environment (ICPE), since its inception in January 1999, has been continuously highlighting the environment-friendly image of plastics by focusing on the positive role of Plastics in conserving resources and its 100% recyclability, apart from illustrating the benefits of the use of plastics in healthcare, packaging, agriculture, automobiles, building, water transportation, electronics and communication, household and appliances and in virtually all segments of modern life.

ICPE has been publishing abstracts of various study reports of eminent scientists of elite academic and research institutes of the country, in its Eco-Echoes Newsletter, to communicate the eco-friendly characteristics of plastics.

Eco-Echoes Newsletters are also focused on the various issues of Solid Waste Management problems in general and Plastics Waste Management problem in particular, indicating possible scientific solutions to the disposal issue of plastic wastes. The message of two-bin culture has been regularly brought out in several issues of Eco-Echoes Newsletter.

ICPE is keen to ensure that the mass awareness messages on various myths and realities about plastics are communicated appropriately among all concerned in the society.

In mid-2003, Eco-Echoes Newsletter had adopted a new approach in its publications. With the current issue, Eco-Echoes Newsletter has embraced yet another new look to suit the present requirement of more transparency.

All issues of Eco-Echoes are uploaded on the ICPE website for easy accessibility.

I hope you would find the Eco-Echoes Newsletter more informative and useful. Any suggestions may kindly be forwarded for further improvement of future issues.

T. K. Bandopadhyay

Editor

Studies on the Selection of Plastic Woven Sacks for Storage of Food Commodities

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Food Protectants and Infestation Control Department, Grain Science and Technology Department, Central Food Technological Research Institute, Mysore - 570 020, India.

Abstract

Mycological and insect penetration studies were evaluated on paddy, rice and wheat stored for six months (at RT and accelerated condition) in Jute, Poly Propylene (PP) and High Density Poly Ethylene (HDPE) woven sacks. Thirty different species of fungi belonging to the genus *Aspergillus, Mucor, Rhizopus, Alternaria, Penicillium, Cladosporium* and some mycelia sterile were isolated by decimal serial dilution technique. *Aspergillus*, Sp. was predominant in almost all the samples analysed. Total fungal counts varied considerably among the commodity and the paddy harboured higher number of fungal population than rice and wheat. The samples stored at an accelerated condition exhibited total deterioration of the commodity within 15 days due to rapid fungal growth and at the end of 30 days of storage, visible fungal colonies were observed on the surface of the grain. Based on the mycological analysis and insect penetration studies it is evident that HDPE and PP woven sacks are more suitable for storage of food grains than the traditional Jute sacks.

Key Words: *Woven sacks, Grain-storage, Fungal load, Periodical sampling, Insect Penetration and Accelerated condition.*

Introduction

From the early stages of kernel formation on the standing crop until their use and consumption, cereal grains are subjected to damage of several biological agents, mainly fungi (Christensen 1991). The fungi colonizing grain have been classified into two groups, known as 'field' and 'storage' fungi (Christensen and Kaufmann, 1969). Field fungi characteristically colonize the ripening grain and include *Alternaria, Cladosporium, Helminthosprium* and *Fusarium* Sp., but they seldom develop further in storage conditions. In contrast, storage fungi are present in low numbers before harvest but develop rapidly in storage, when conditions are favourable, mainly *Aspergillus* and *Penicillium* Sp. Although low levels of storage fungi present during harvest, much is added during threshing, winnowing, drying and when grain is stored in contaminated stores (Lacey 1971; Flannigan 1978). The third and intermediate group of fungi such as *Fusarium* Sp., which can sometimes develop in most grain during storage (Pelhate 1968). Field fungi require readily available water and therefore seldom develop in storage situation; while storage fungi, especially *Apergillus* Sp. are able to grow at low water activities (aw, 0.70-0.75) enabling them to initiate grain spoilage. Fungi that infest grains in storage is responsible for decrease in germination, discoloration, heating, mustiness and total spoilage (Lacey et al. 1991, Lacey and Magan, 1991). Both storage and field fungi can produce mycotoxins which may cause health hazards to humans and animals after their ingestion (Christensen 1991, Frisvad and Samson 1991 and Miller 1995). Further, these spores are also responsible for respiratory diseases in people handling and transporting them. Although fungal invasion depends on growth and harvest conditions, any such internal mycota may be responsible for fungal spoilage of the product or more significantly, formation of mycotoxins in the product (King et al. 1986 and Mils, 1989). For all these parameters, the type and number of genera

and species present soon after harvest and drying can provide information useful for the control of moulding in store by different processes (e.g. drying, chemical treatment and modification of atmosphere). On the other hand, the Sp. present can give information on the conditions under which grains have been stored. Therefore, it is essential to characterize and identify the spoilage fungi, in order to control and prevent fungal growth and potential mycotoxin formation (Gourama and Bullerman, 1995).

In India, a majority of the food grains are stored in jute sacks since ages. This is because the jute sacks are cheap and they are porous in nature. Due to several advantages of polymers, selection of alternatives to jute sacks or most suitable packaging material can ultimately result in improved shelf-life and better quality while reducing costs, particularly by avoiding undue food losses and waste (Elias 1979). A good packaging material should not support the growth of contaminating fungi and insect development. It is important to evaluate the packaging material with respect to microbiological quality during storage of food grains. Therefore, the present study was undertaken to assess the suitability of commodity storage, insect penetration and variation in fungal profile in paddy, rice and wheat stored in three packages such as PP, HDPE and Jute sacks at ambient (RT) and accelerated conditions.

Materials and Methods

Packaging Materials

Fresh woven sacks made of HDPE, PP and Jute were used for short duration (6 months) storage of wheat (*Triticum aestivum*), rice (*Oryzae sativa*) and paddy. The above three types of sacks were supplied by Indian Centre for Plastics in the Environment, Mumbai.

Storage Condition

Paddy, rice (variety Sona-Mahsuri) and wheat (variety Duram) harvested during December 2003 were procured from one of the local mills of Mysore. Paddy was packed in HDPE, PP and Jute sacks, each containing 35 kg; while rice and wheat were packed in 50 kg sacks (based on their bulk density) and they were machine stitched. Sacks were placed one above the other vertically, where in each column, six sacks were arranged and stored for six months at ambient conditions (RT). The above commodities were also stored in 1 kg pack (25 x 20 cm, size) of HDPE, PP and Jute sacks respectively and were stitched as above. These small unit pack bags were stored at accelerated conditions (38 ± 1°C and at 90 ± 2% RH). Sufficient gap was maintained for each set of experiment to avoid cross contamination of insects and rodent interactions, if any, during storage.

Withdrawal of Sample and Mycological Analysis

In each withdrawal, the sack was opened and the sample was poured on to an aluminium tray (3 x 6 x 1) and 1 kg sample were taken out after thorough mixing. Samples stored at RT were withdrawn on a monthly basis while the other set of samples stored at accelerated condition was drawn after 8 and 15 day intervals. Mycological analysis was carried out in triplicate plates on the same day using Potato Dextrose Agar (PDA), which was purchased from Hi-Media Ltd., Mumbai. The samples were analysed by decimal serial dilution technique (Harrigan and McCance,1990). 10 gm of appropriate sample was taken into 100 ml of 0.1% peptone solution in 250 ml Erlenmeyer flasks which were subsequently shaken in a Lab-line incubator-shaker for 30 min at 140 rev/min. Serial dilutions were made from the stock suspension upto $1:10^6$/ml. 1 ml aliquot of appropriate dilution was taken onto sterile petri plate and 15 ml of molten PDA was poured over it. The plates were allowed to solidify and incubated at 25 ± 1°C, and the colonies were

counted after 5 days. Triplicate plates were maintained for each set. Fungal identification was done based on colony characterization and morphological structures under the microscope (Olympus, Japan) according to Raper and Fennell (1965).

Insect Penetration Studies

An experiment was conducted at room temperature (25 ± 1°C and 60 ± 5% RH) with a clean and dry dessicators (0.85L cap.) which served as test chambers. The dessicators were filled with 500 gm of wheat that was earlier kept in freezer for 24 hours to kill live insects, if any. The packaging materials such as PP and HDPE were cut into 15 cm^2 size and were sandwiched between bottom and lid of the dessicators. Five replicates were maintained for each packaging material with an equal number of replications for gunny sacks which served as a control. From the established cultures of *R. dominica* (lesser grain borer), *S. oryzae* (rice weevil) and T. *castaneum* (rust-red flour beetle) adults (2-3 days old), 100 per replicate were released on the packaging material through the aperture of the desiccator lid and the aperture was closed with rubber septum. The rubber septum was opened for 2 min daily for sufficient aeration to the insects. This was continued for 2 weeks. At the end of experiment, wheat kept in the desiccator was sieved to count the insects penetrated if any, through the packaging materials and the percentage of insect penetration in each packaging material was calculated.

Results and Discussion

The results of rice, paddy and wheat stored for six months at RT in different types of sacks such as Jute, PP and HDPE are shown in Table-1. Total fungal counts vary considerably among the commodity tested and paddy harboured a higher number of fungal population than rice and wheat throughout the study. The fungal profile in the commodity stored at RT has decreased within 3 months, irrespective of type of sacks in which they have been stored, although there was a fluctuation in fungal population in paddy samples (Table-1). Data on mycological analysis carried out from initial rice samples yielded 17.1 x 10^3 cfu/gm. Subsequent analysis indicated a drastic reduction in the population in samples analysed from 1st and 2nd month and no fungal colonies were isolated from 3rd to 6th month. Contrary to this, the rice samples stored in PP and HDPE sacks, did not support fungal growth throughout the study. The fungal profile in paddy storage was different from rice and wheat. In the case of paddy, the population of fungi was observed throughout the study in all

Table - 1. Fungal population in rice, paddy and wheat stored for six months at ambient temperature (RT)

Duration of storage	Fungal population (x10^3 / cfu / gm)								
	RICE			PADDY			WHEAT		
	JUTE	PP	HDPE	JUTE	PP	HDPE	JUTE	PP	HDPE
Initial Load	17.1±3.0	NT	NT	33.0±3.8	NT	NT	124+11.2	NT	NT
1st month	1.4±0.2	0	0	60.4±5.1	46.7±4.4	39.3±3.8	77.0±2.9	41.0±3.4	28.9±2.8
2nd month	1.0±0.2	0	0	68.2±7.2	58.0±5.2	55.3±4.0	10.0±1.4	3.0±0.2	2.0±0.2
3rd month	0	0	0	98.4±13.7	101.4±13.8	86.0±12.1	0	0	0
4th month	0	0	0	60.0±6.6	45.0±9.3	35.0±9.6	0	0	0
5th month	0	0	0	36.3±4.6	20.2±1.8	22.6±1.1	0	0	0
6th month	0	0	0	32.6±3.1	55.1±3.2	71.8±8.3	0	0	0

Values represent the mean ± standard deviation of triplicate plates
NT = Not tested

Table - 2. Fungal population in rice, paddy and wheat stored for 30 days at accelerated condition (90±2%RH and 38±1°.C)

Commodity	Duration of storage	Fungal population (x10^{3}cfu/gm) in different packaging material		
		JUTE	PP	HDP
RICE	Initial Load	0	0	0
	8 days	4.1±0.4	3.8±0.5	3.2±0.3
	15 days	214.7±9.9	13.7±0.2	4.1±0.8
	30 days	>300	>300	>300
PADDY	Initial Load	24.2±5.1	NT	NT
	8 days	77.2±6.2	74.8±5.9	76.4±5.6
	15 days	196±8.1	140.5±12.4	131.0±12.4
	30 days	>300	>300	>300
WHEAT	Initial Load	82.7±4.25	NT	NT
	8 days	184.7±19.2	137.6±6.5	101.3±5.8
	15 days	266.3±18.3	179.8±7.4	124.2±5.8
	30 days	>300	>300	>300

Values represent the mean ± standard deviation of triplicate plates
NT = Not tested

three packaging materials. Also, in Jute sacks there was a gradual increase in the fungal population up to 3 months and declined further in subsequent analysis. However, in PP and HDPE sacks although there was an increasing trend initially, further analysis indicated a fluctuation in the population. Data on wheat storage revealed a gradual decrease in the population within 2 months and no fungal colonies were recorded in the subsequent analysis.

In the present finding, woven PP and HDPE sacks did not show any fungal colonies in rice, and lesser number of colonies in wheat samples. The results obtained here corroborate with Odamtten et al. (1985a), who reported that woven PP sacks did not support the growth of fungi in maize stored for 4 months in Jute sacks. Odamtten et al. (1985b) also stated that grain contents stored in PP sacks were of better microbiological quality than those kept in Jute sacks and there was a positive correlation between the final mycoflora on Jute sacks and loss in tensile strength due to the presence of saprophytic fungi such as Sp. of *Aspergillus, Fusarium, Penicillium, Rhizopus* and *Ttichoderma*. Jute sacks contain sufficient nutrients to support fungal growth. This implies that fungi can attack this packaging material and cause mechanical and chemical damage and soiling (Hueck, 1965). Fungi therefore play a major role in the reduction of tensile strength of the Jute sacks. Presence of fungal spores on the fabric of Jute sacks, in addition to soiling the sacks it also alters the appearance of the sacks by their coloured metabolites.

The fungal species isolated and identified include Sp. of Aspergillus: *A.candidus, A. speluneus, A. niger, A. fumigatus, A. Ochraceous, A. flavipes, A. versicolor, A. ornatus, A. sparces, A. sulphuricus, A. asperescens, A. sydowii, A. terricola, A. biplanus, A. wenti, A. parasiticus, A. flavus, A. alliaceus, A. chevalieri, A.restrictus, A.cremius, A. sclerotiarum, A.thomii, A.canoyii, and Sp. of Mucor, Rhizopus, Alternaria, Penicillium, Cladosporium* and Mycelia sterila.

With regard to insect development in paddy and rice stored in Jute sacks exhibited a large number of

adult *Carcyra cephalonica* (rice moths) and other insect species from the second month and continued till the end of storage. Almost the same trend was observed in woven PP sacks, except that the moth development was delayed up to the 6th month. Contrary to this, the rice and paddy stored in HDPE sacks and wheat stored in all three types of sacks, neither moths nor insects were developed throughout the study. This indicates that HDPE sacks are more suitable in preventing fungal development during commodity storage and thereby protecting the grain quality.

Results of data on rice, paddy and wheat stored at accelerated condition (at 90%RH and 38°C) are shown in Table-2. Initially, the fungal population in rice was not observed at 10^3 dilution. Subsequent analysis after 8 and 15 days of storage, there was a significant increase in fungal population. At the end of 30 days of storage, the population has reached >300cfu/gm. Paddy and wheat on the other hand, had initially yielded 24.2 x 10^3 and 82.7 x 10^3 cfu/gm, respectively and has reached >300cfu/gm at the end of 30 days of storage. As expected, the samples exhibited total deterioration within 15 days due to rapid fungal proliferation (black and green spots) and by the end of 30 days visible fungal colonies were also detected.

During the storage of commodities, packaging provides a physical barrier that prevents or impedes the infestation by insects. With reference to packaging materials, there are three factors that determine the infestation of a commodity. They are insect species, type of packaging materials and type of commodity packaged. Insects may very in their capacity to penetrate packaging materials. In addition, holes larger than 2mm² will allow most of the stored product adult insects to enter packages, whereas holes smaller than 0.3mm² will prevent the entry of most stored-product insects (Cline & Highland, 1981). Most research to determine the penetration abilities of various species of stored-product

insects were against the packaging films (Cline 1978, Highland 1988), but not with woven plastic packages. There has been no previous reports available on insect penetration of plastic woven packages. The present study carried out on this aspect revealed that, among the three packaging materials tested, maximum penetration was observed in Jute sacks. The level of penetration in Jute sacks was 98.7, 83.8 and 67% of the tested *T.castaneum*, *R.dominica* and *S.oryzae*, respectively (Table-3). With the plastic woven sacks, only 2.9% of the

Table - 3. Insect penetration through different packaging material

Packaging Materials	% insect penetration		
	T.castaeneum	R.dominica	S.oryzae
JUTE	98.7±6.3	83.8±7.5	67.0±4.1
PP	0	2.9±0.1	0
HDPE	0	0	0

Values represent the mean ± standard deviation of five replicate samples

tested *R.dominica* were penetrated through polypropylene (PP) woven sacks, while none of the *T.castaneum* and *S. oryzae* could penetrate through PP. Conversely, there was no penetration in HDPE woven sacks by all the three insect species tested. From these results it is evident that the plastic woven sacks (both HDPE and PP) are more tolerant to insect penetration in comparison with Jute sacks. Therefore, the plastic woven sacks are more safe and advantageous in preventing insect penetration during commodity storage than traditional Jute sacks.

Conclusion

In summary, the present findings revealed that there was a significant difference between the higher number of fungal colonies associated with Jute sacks, than woven PP and HDPE sacks. Among the three commodities stored at RT paddy harboured higher number of fungal colonies than rice and wheat throughout the storage period. Based on the results of both mycological analysis and insect penetration studies it can be concluded that woven HDPE and PP sacks have many microbiological and physiological advantages over the traditional Jute sacks to merit their use for commodity storage. This would probably save defects and losses due to insects and fungi which were estimated to be over 30% of the annual harvest.

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Awareness Programme in Corporate House

On the request of a Corporate House based at Ropar, Punjab, having its head office in Delhi, ICPE had organised an awareness programme on "Role of Plastics in the Environment", clarifying the myths and misconceptions about Plastics in the mind of people, on Dec. 11 and 12, 2007. Ms. Savita Pradeep of ICPE, Delhi, conducted the two-day programme, which was attended by 92 employees of the corporate house. ICPE Brochures and Newsletters, providing information on Plastics Waste Management and Plastics and Environmental issues, were distributed and a film, "Living in the Age of Plastics" was screened.

The management of the Corporate House appreciated ICPE's efforts and assured that it would carry the message to the other sections of the society in and around Ropar.

Awareness Programme in the Annual Green Fair 2007 organised by Modern School, New Delhi

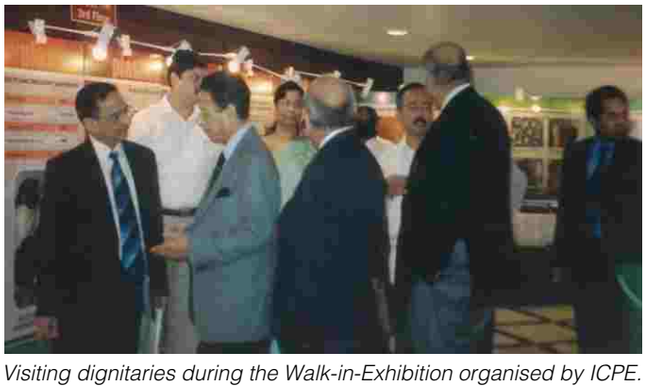
On November 6, 2007, Modern School, Vasant Vihar, New Delhi had organised the Annual Green Fair 2007 in its campus. ICPE participated in the fair and conducted an awareness programme on ICPE's efforts in Solid Waste Management. An attempt was made to bring about an awareness of the correct way of waste disposal, among the youth. Various myths and the realities about plastics were also brought forward before the youth, by way of distribution of newsletters, booklets and display panels. An ICPE Film, "Living in the Age of Plastics", "Plastics Recycling" and a cartoon film for children, "World of Plastics" were screened.

Visitors appreciated ICPE's efforts in bringing about an awareness about waste management and anti-littering and the good display of educative materials. The management of the school invited ICPE for further programmes in future.

Release of National Policy on Petrochemicals and the Plastindia Foundation Publication titled "Plastics Enhancing Lives"

Hon'ble Minister seeking clarification on certain points from ICPE and Plastindia Team.

The ICPE and Plastindia Team explaining the display panels to Hon'ble Minister Shri. Ramvilas Paswan. (L to r): Mr. Arvind Mehta, President, Plastindia Foundation, Mr. Amar Seth, Vice President, Plastindia Foundation, Hon'ble Minister, Mr. Mihir Banerji, Reliance Ind. Ltd.; Mr. Anil Anand, Plastindia Foundation and Mr. T. K. Bandopadhyay, ICPE.



Visiting dignitaries during the Walk-in-Exhibition organised by ICPE.

Ms. Savita Pradeep of ICPE is explaining some issue to the dignitaries.

On the September 28, 2007, at a grand function of the government and industry at Hotel Ashoka, New Delhi, chaired by Hon. Minister for Chemicals, Fertilisers and Steel, Shri. Ram Vilas Paswan and Minister of State for Chemicals and Fertilisers and Parliamentary Affairs, Shri. B. K. Handique, the National Policy on Petrochemicals and the publication, "Plastics Enhancing Lives", were publicly released.

ICPE had organised a walk-in exhibition, displaying panels on plastics recycling and samples of plastic recycled products, which was appreciated by the Minister and all others. Both Hon'ble Ministers, Shri. Ram Vilas Paswan and Shri. B. K. Handique took keen interest and observed the display minutely. Recycling Technologies of plastics, including the use of waste plastics in tar roads, production of fuel from waste plastics, recovery of energy from waste plastics (cement kilns) and manufacture of luggage from waste car batteries, were explained through the panels. The Minister was happy and later made specific suggestion in his address to make arrangements for similar exhibitions for mass awareness, for those who are not aware of such possibilities in the manufacture of useful products from recycled plastics. The Minister also stressed that the industry should ensure that consumers get the cost benefit of recycled plastic products. He said this, giving the example of briefcases manufactured from battery waste. The Minister also answered questions from the press, on various critical points on anti-plastics propaganda.

A short film on Waste Management was screened with clippings from earlier ICPE films in addition to some interviews with BMC officials and with some NGOs. The participating delegates appreciated the efforts of Plastindia Foundation and ICPE.

Awareness Programme at Lady Sri Ram College, New Delhi

ICPE conducted an awareness programme at Lady Sri Ram College, New Delhi and made a presentation on recycling and Plastics Waste Management, on September 26, 2007. This was subsequent to the programme organised last year, after which the President of their eco-club, "Prakriti", had invited ICPE to

year as well. The progamme was conducted in the seminar hall of the "Prakriti" Eco-society. A presentation was made on Recycling & Plastics Waste Management, with special emphasis on the message of segregation of waste at source and anti-littering. The students were briefed on the various applications of plastic, its benefits and the latest

technologies of waste management and recycling of plastics. This was followed by the screening of the film, "Living in the Age of Plastics" and an interactive question-and-answer session. The students showed a keen interest in the progamme and were eager to initiate a waste management project in their college premises.

Students listen attentively to the talk in the ICPE-LSR College Programme, New Delhi.

LSR College presentation, New Delhi.

ICPE Participation in Plastivision 2007 Exhibition, Mumbai

ICPE participated in the Plastivision 2007 Exhibition, organised by the All India Plastic Manufacturers' Association (AIPMA), in collaboration with Plastindia Foundation (PIF) during 6th - 10th December, 2007.

Through display panels and samples of recycled plastic products, awareness was created among the visitors, on the possibilities of using recycled plastic products for various non-critical applications. The model project in Mumbai on the collection and segregation of dry wastes, including plastic wastes, was highlighted in detail.

The message spread through the ICPE stall was well appreciated by the visitors, which included dignitaries from elite academic educational institutes and local self-government bodies.

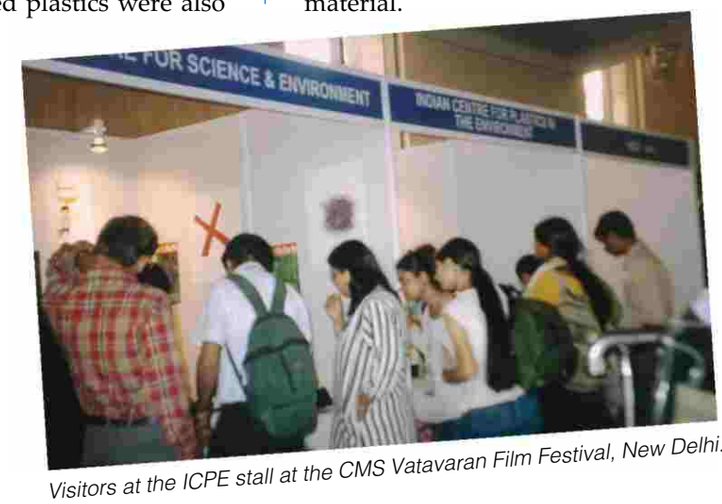
Mr. Sujit Banerji, Chief Guest of the Seminar organised during the exhibition, being felicitated.

The delegation from IIT (Mumbai), with the ICPE team.

ICPE Participated in the 4th CMS Vatavaran - Environment and Film Festival, New Delhi

ICPE Participated in the 4th CMS Vatavaran - Environment and Film Festival held at the India Habitat Center, New Delhi from 13th-16th September, 2007. The festival was an activity forum for promoting environment issues in the public media, serving the dual purpose of generating awareness on environmental issues and to recognize and applaud the environment and wildlife film makers. ICPE had booked a stall-cum-exibition space of 4 x 3 meters in the lobby area just outside the Stein Auditorium, which was an ideal place to exhibit our awareness film and distribute ICPE literature. The educative panels of ICPE and the banners were displayed and awareness booklets were distributed. Copies of the recent edition of newsletter - Eco Echoes were displayed and distributed among the visitors, who showed interest on issues of plastics and the environment and waste management. The film, "Living in the Age of Plastics", cartoon film for children and the ICPE film, "Plastics Recycling" were being shown in a continuous loop. All the ICPE publications and folders made of recycled plastics were also displayed. More than 5,000 visitors attended the film festival over a period of 5 days and a majority of them visited the ICPE stall. Visitors included noted dignitaries, Government officials, NGOs, film makers, journalists, media personnel, research institutes, delegates from foreign embassies, lecturers, teachers, school and college students and the general public. The visitors were very appreciative of ICPE's efforts in plastics waste management and anti-littering and the interesting display of educative material.

A view of the ICPE stall at the CMS Vatavaran Film Festival, New Delhi.



Visitors at the ICPE stall at the CMS Vatavaran Film Festival, New Delhi.

Use of Plastics Waste in Tar Road

The BMC's, Road Engineering Department has officially approved the proposal of ICPE for the construction of a long stretch of Tar Road using plastics waste. An automatic plastics waste dosing machine has been installed in the Asphalt Plant of the BMC at Worli and preparation for the trial construction has already started.

Carbon Count

■ The UK's National Endowment for Science, Technology and the Arts has introduced the Big Green Challenge £1m prize fund. The challenge is for non-profit groups based in the UK to reduce Co_2 emissions within their community by 60%. Groups had until 29 February to enroll and the winnner will be announced in late 2009. Website:www.biggreenchallenge.org.uk.

■ Several leading paper mills in the UK will undergo steps to reduce their energy emissions as part of the Carbon Circles Project created by the Paper Industry Technical Association, based in Bury, UK. The £32,800 scheme, which began in March 2007 and is sponsored by the Carbon Trust, will measure factories' carbon footprints and establish a training network for supervisory staff and machine crews. Website: www.pita.co.uk.

■ The European Parliament voted on 29 November, 2007 in favour of packages displaying 'information on the energy consumed and greenhouse gases emitted, during (their) manufacture and transport'. Jane Bickerstaffe, Director of the Industry Council for Packaging and the Environment, responded to the move, saying ,'We are supportive of measuring carbon for emission. [However] we don't think a carbon label would be useful - why not a water label or a materials label as well? It will mean nothing to consumers who want to know that companies have understood the environmental impact of their products and take responsibility for continuously improving it'.
Website : www.europarl.europa.eu and www.incpen.org.

Packaging Tax Removed in Finland

From 1st January, the Finnish Government eliminated its levy on recyclable plastic bottles. Under previous legislation, a tax of 8.5 cents (reduced from 17 in 2005) was applicable to all except refillable drinks bottles. The new system has exempted all companies producing recyclable plastic bottles, prompting a number of breweries and businesses to switch from refillable PET bottles to One-Way (OW) recyclable PET alternatives. Sinebrychoff, Finland's largest brewer, based in Helsinki, has invested about 70m euros in a OW-PET production line that blows 36,000 containers per hour. Meanwhile, the Olvi group is installing a 18,000/hour single trip PET bottling line at its brewery in Iisalmi, reports PRW.com (12 September 2007). Production is due to start early this year. For further information on packaging taxes abroad, see "The Packaging Professional", November/December 2007, p2.

ICPE Website Hits

The ICPE Website continues to attract visitors in large numbers. A record of the website's hits from 2006-07 and 2007-08 have been given in the table. The average number of hits is observed to be around 45,000 per month.

MONTH	2006-07	2007-08
April	NA	47689
May	44488	46831
June	54265	49716
July	43590	56236
August	55239	58627
September	58141	49621
October	72791	50984
November	48351	39384
December	44541	51527
January	45617	46164
February	44720	
March	49491	

Top 10 Myths about Plastic Grocery Bags

Myth 1:

Plastic bag bans are spreading like wildfire across the country.

Fact:

No. In fact, plastic bags have not been banned anywhere, not even in San Francisco. San Francisco requires that consumers use compostable plastic bags instead of 100% recyclable bags. Contrary to popular belief, there is **a** growing movement to increase access to recycle plastic bags - not eliminate them. New Jersey, Connecticut and cities in California have all taken recent action to table legislation that would ban certain types of plastic bags and instead, are now looking to implement plastic bag recycling programmes.

Myth 2:

Paper grocery bags are a better environmental choice than plastic bags.

Fact:

Plastic bags are 100% recyclable and for all environmental impacts related to air emissions, water emissions and solid waste - those of paper bags are significantly greater than that of plastic grocery bags:

- Plastic bags use 40% less energy to produce and generate 80% less solid waste than paper.[1]
- Paper bags generate 70% more emissions, and 50% times more water pollutants than plastic bags.[2]
- Even paper bags made from 100% recycled fiber use more fossil fuels than plastic bags.[3]

Myth 3:

Plastic bags are the largest component of landfills and the primary component of litter.

Fact:

The item most frequently encountered in landfills is paper – on an average, it accounts for more than 40% of a landfill's contents.[4] Newspapers alone take up as much as 13% of landfill space.[5]

Cigarette butts, chewing gum and candy wrappers account for about 95% of all litter in the English-speaking world.[6] Education, as well as responsible use and disposal of all materials and products, is the key to reducing litter.

Myth 4:

Plastic grocery bags take 1,000 years to decompose in landfills.

Fact:

Virtually nothing – not paper, food, plastic or even compostable or biodegradable products - decomposes in today's landfills, because they are actually designed to be as stable and dry as possible. Research by Williams Rathje, who runs the Garbage Project, has shown that when excavated from a landfill, newspapers from the 1960s can be intact and readable.

Myth 5:

Plastic bags feed America's addiction to oil.

Fact:

Plastic bags are extraordinarily energy-efficient to manufacture. Eighty percent of the plastic used to make plastic bags in the US comes from North American Natural Gas, not oil.[7]

Less than .05% of a barrel of oil goes into making all the plastic bags used in the US, while 93% - 95% of every barrel of crude oil is burned for fuel and heating purposes.[8] Although they are made from natural gas or oil, plastic bags actually consume less fossil fuels during their lifetime than do compostable plastic and paper bags.[9]

Myth 6:

Compostable bags can degrade in backyard composts.

Fact:

In order to break down, compostable bags must be sent to an industrial composting facility, not to backyard piles or municipal composting centers. There are very few of these facilities in the US and where these facilities are not available, compostable bags will sit in landfills because they can't be recycled.

Myth 7:

For people who live near water, paper bags are the environmentally friendly choice to protect marine wildlife.

Fact:

Since paper bags production has more negative environmental impacts related to air emission, water emission and solid waste than plastic grocery bags, they're not a solution. Recycling and proper disposal of all products would make

Myths & Facts

sure that any threat to the environment, including wildlife, would be reduced.

Myth 8:

Low recycling rates for plastic bags prove that recycling them doesn't work.

Fact:

Recycling does work. The problem is that not everyone knows that plastic grocery bags are 100% recyclable and not everyone has access to plastic bag recycling in their community. A national at-store plastic bag recycling programme would bring the recycling solution to everyone and increase rates. One Southern supermarket chain has such a programme, and recycles more than 20% of the volume of plastic bags that it provides to customers.

Myth 9:

Recycling plastic bags are so expensive.

Fact:

The price of **not** recycling them is high. Recycling can help save resources and minimize the amount of waste going to landfills. Also, recycling helps reduce litter, as bags are contained and stored. It's worth noting that it takes 91% less energy to recycle a pound of plastic than it takes to recycle a pound of paper.[10]

Myth 10:

There's no demand for recycled plastic.

Fact:

Today there is a growing market for recycled plastic, that didn't exist 15 years ago. It's also cheaper now to use recycled plastic than to obtain new material, increasing the potential for more recycling of used plastic bags. Recycled plastic grocery and shopping bags are currently being made into new consumer products such as clean new plastic shopping bags, outdoor decking and railing products.

1 U.S. EPA website (www.epa.gov/region1/:communities/shopbags.html)
2 Ibid
3 REPA of Polyethylene and Unbleached Paper Grocery Sacks, prepared for the Solid Waste Council, Franklin Associates Report, June 1990
4 U.S. EPA website (www.epa.gov/msw/paper.htm)
5 U.S. EPA website (http://www.epa.gov/msw/fag.htm)
6 *Litter Composition Survey of England*, October 2004, produced by ENCAMS for INCPEN (www.incpen.org/pages/userdata/incp/LitterCompSurvy24Jan2005.pdf)
7 Cradle-to-Gate Life Cycle Inventory of Nine Plastic Resins and Two Polyurethane Precursors – Franklin Associates. A Division of Eastern Research Group, Inc. March 2007
8 Chemical Market Associates, Inc.
9 Evaluation des impacts environnementaux des sacs de caisse Carrefour (Evaluation of the Environmental Impact of Carrefour Merchandise), prepared by Price Waterhouse-Coopers/Ecobilan(EcoBalance). February 2004, #300940BE8, (www.ademe.fr/htdocs./actualite/rapport carrefour post revue critique v4.pdf).
10 US EPA website (www.epa.gov/region1/communities/shopbags.html)

Source: www.progressivebagalliance.com

New Launch

'PE has lauched it's Corporate
ure with a fresh new look,
the mission and key activities
een featured.

PVC Toys and Phthalate Plasticizers

In recent times, there have been some queries relating to the safety of PVC toys. The reality about the issue is briefly explained below.

1) Query:

Views on the toxicity level in the PVC toys along with the use of specified plasticizers / stabilizers, by the Indian manufacturers.

ICPE Response:

PVC (Poly Vinyl Chloride) is one of the largest consuming plastic materials in the world and is probably the most researched plastic since more than 50 years. PVC is approved by regulatory bodies all over the world, including India's for manufacturing items that are used for the packaging of food products, storing and transportation of potable water and pharmaceutical products, storing blood (blood bags), apart from various other industrial and domestic uses.

PVC is one of the few polymers which need an intermediate stage of processing, called compounding, before fabricating it into the end products via different processing techniques like extrusion, injection moulding, calendaring etc. During the compounding process, different additives are to be added to avoid any degradation in the polymers and also to facilitate the processing. Regulatory bodies over the world have specific standards controlling / regulating the types and levels of these additives into the polymer. The Bureau of Indian Standards also has specifications for the use of various additives in the compounding process of PVC.

While making flexible PVC products, a softening agent called plasticizer is required to be added. The regulatory bodies have specific standards / specifications regulating the use of such plasticizers in above PVC compound. Flexible PVC products are also used for manufacturing toys. When the specified type of constituents, as per the limit specified in the regulatory standards, are used for manufacturing any PVC product including PVC toys, there is no probability of causing any toxicity by those products, either to the environment or to the user of those products.

Commonly used plasticizers, namely phthalate plasticizers, are completely safe for use in PVC formulation for manufacturing products intended for use in contact with food and medical products. Although there was a suspicion earlier that DEHP (Di-Ethyl Hexyl Phthalate) was carcinogenic to humans, however in February 2000 after extensive studies,the International Agency for Research on Cancer (IARC) classified DEHP in Group 3 (not classifiable as to carcinogenicity to humans). DEHP is used extensively to soften PVC products including many life saving medical devices like blood bags.

2) Query:

Are there any standards for the manufacture of PVC toys or similar PVC products?

ICPE Response:

The Bureau of Indian Standard (BIS) has adopted the specifications laid down by the International Organisation for Standardization (ISO) relating to toys.

IS 9873 (Part 1) : 2001 / ISO 8124-1 : 2000 titled Indian Standard - Safety Requirement for Toys (First Revision) deals with the safety aspects related to the mechanical and physical properties of toys.

IS 9873 (Part 3) : 1999 / ISO 8124-3 : 1997, reaffirmed 2005, titled Indian Standard Requirement for Toys (First Revision) deals with the migration of certain elements. The maximum acceptable element migration from toy materials has been clearly specified in this standard. These elements include Tin, Arsenic, Barium, Chromium, Lead, Mercury and Selenium.

Queries

The Indian Standard IS:10148-1982, reaffirmed 02-2003, titled Positive List of Constituents of Poly Vinyl Chloride (PVC) and its co-polymers in contact with foodstuffs, pharmaceuticals and drinking water, deals with all types of constituents used in both rigid and flexible PVC products which may come in contact with food products etc. It also deals with the type and level of plasticizers to be used in such products.

It is understood that implementation of any standard specification is a matter of agreement between the seller and the buyer, in the absence of any other binding condition.

3) Query:

Are there any other details relevant to the issue?

ICPE Response:

Influenced by insufficient knowledge and information, some international organizations had been alleging that phthalate plasticizers present in the PVC toys, pose health problems to children who could put those toys into their mouths. However, enough scientific evidence was not available to prove the above allegation. The European Parliament had imposed a ban in July 2005, on the use of six phthalates - DEHP, DBP, BBP, DINP, DNOP and DIDP, in toys and childcare articles, where their concentration exceeds 0.1% by mass of the plasticized material. This action of the European parliament, taken on the basis of a majority vote, caused dissatisfaction in the scientific fraternity, as the scientific data did not call for such an action.

However, in a recent development, the same European Union (EU) confirmed on 13th April, 2006, that the most widely used plasticizers are not classified as hazardous and pose no risks to either human health or the environment, from their current use. The publication in the European Union Official Journal of the outcomes of the EU Risk Assessments for DINP and DIDP marks the end of a 10 year process of extensive scientific evaluation by regulators and provides confirmation of safety for users across Europe (and elsewhere).

ICPE views on some other points :

- Recycled Plastics should not be used for making toys which children could put into their mouths.
- All pigments / colorants used for manufacturing the toys should be as per IS 9833 : 1981.

Forthcoming Events

Chinaplas 2008

17th - 20th April, 2008

Shanghai New International Expo. Center,
Pudong, Shanghai, P. R. China

INDIAPACK

INDIA PACK 2008

Organised by

IIP, Mumbai

18th - 21st September, 2008
Mumbai

INDIA CHEM 2008

5th International Exhibitions & Conference
Organised by

FICCI

20th - 22nd October, 2008
Mumbai

PLASTINDIA 2009

7th International Plastics Exhibition and Conference

31st January- 5th February, 2009
Pragati Maidan, New Delhi
For more info:
Website : www.plastindia.org

Let this not happen again...

...for every Drop is precious

Water, a source of life and one of the precious gifts of nature is also very scarce. Water scarcity in India has resulted in environmental degradation in the form of millions of hectares of uncultivable waste and arid lands.

Eco-friendly plastics have brought about Second Green revolution in agriculture and water management. Minor and Micro Irrigation systems like sprinklers and drip using plastics help in conserving water to the tune of 40% to 70% besides improving agricultural productivity and quality of produce. Plastics have al so made it possible to bring vast tracks of arid land under farming.

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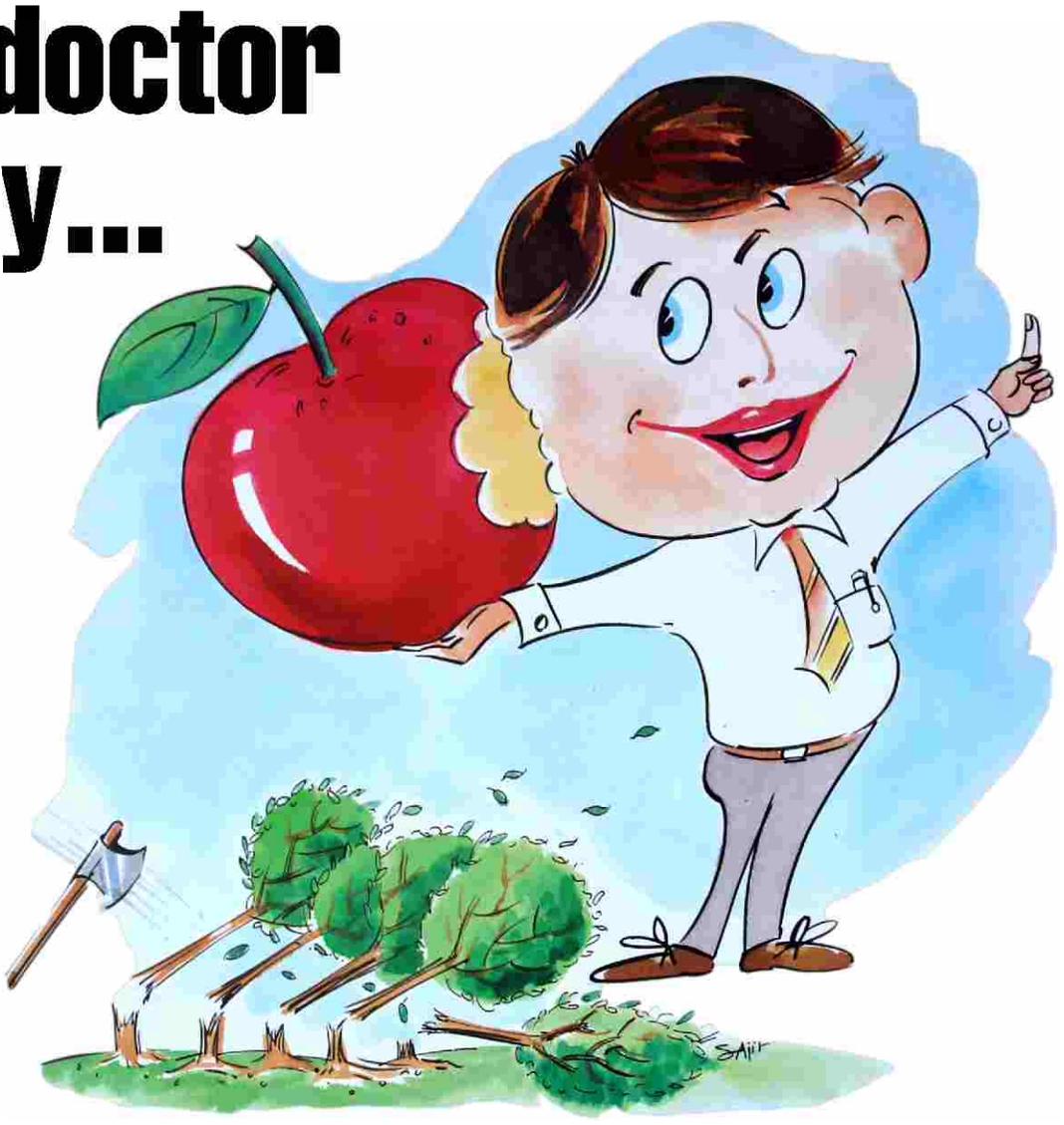
ICPE

An apple a day keeps the doctor away...



It also fells a tree not so far away

In India, Apples are packed and transported in wooden boxes - an eco -unfriendly system which has led to large scale deforestation. Each wooden box holds 20 kgs apples and for every 175 kgs of apples we consume, we use 35 cubic feet of wood consequently felling a large number of trees.

By using eco-friendly plastic crates and cartons in place of wooden boxes for packing apples alone, millions of trees are saved from the axe every year thus preventing deforestation of precious forest cover.

Disha ■ 2874 0259

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