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Hazards of Plastic Bags in Dholpur- A Small District town of Rajasthan, India

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Abstract

One of the most common things in our modern world is the ubiquitous plastic grocery bag. Highly convenient, strong and inexpensive, plastic grocery bags are appealing to both customers and businesses as a reliable way to deliver goods from the store to home. However, there are several issues associated with the production, use, and disposal of plastic grocery bags which may not be initially apparent to most users, but which are nonetheless extremely important. By assessing the lifecycle of plastic grocery bags, we can better understand the full ecological footprint of the plastic bag, and find more effective means of dealing with the associated negative impacts. India's plastic consumption is one of the highest in the world. Yet, precious little has been done to recycle, re-use and dispose of plastic wastes. This study shows that even small town of Dholpur with a population of approximately 1.5 lakhs is not free from the menace of plastic bags. The authors assess the type of plastic bags used by different subjects followed by their use and disposal. The study also suggests the judicious and effective ways to tackle the problem at larger level.

Keywords: Plastic bag, pollution, environment, biodegradable, recycle, reuse.

Introduction

The carbon atom has the unique ability of combining with itself to form long chain. These chains can provide the base to which other atoms and functional groups can be attached to produce a large number of compounds[1]. The scientists have used this to design new molecules and compounds of desired shape, size and properties. Plastics are an example of such compounds. Plastics are synthetic materials of high molecular weight manufactured by the polymerisation[2] of organic substances and can be molded into any desired form or shape. There are two types of plastics. Thermoplastics, which can be softened on heating and harden on cooling reversibly. In other words, they soften on heating and remain so as long as they are hot. On cooling, they regain their original rigidity and hardness. Repeated heating and cooling do not alter the chemical nature of these materials. These polymers consist of long chains without any cross linkages between the chains. Some examples of these are polythene, polypropylene, polyvinyl chloride, and polystyrene. Thermosetting plastics, on the other hand, are those that during the molding process get hardened and once they have solidified cannot be softened. Such plastics during molding acquire three-dimensional cross-linked structure with predominantly strong covalent bonds. These bonds retain their strength even on heating. Some examples of these are polyester, bakelite, araldite, melamine[2].

Grocery bags are made from high-density polyethylene, also known as HDPE (High-density polyethylene). Polyethylene is a non-renewable resource made from ethylene, which takes hundreds of years to break down. Polyethylene is appealing to manufacturers because it can be manipulated into any shape, size, form or color. There are two other types of polyethylene, other than HDPE, used to make plastic bags: low-density polyethylene (LDPE) and linear low-density polyethylene (LLDPE). LLDPE makes up thicker, glossy bags, such as carrier bags used by businesses in shopping malls, and LDPE is used to make very thin, filmy bags, such as dry-cleaning bags.

The main difference between the three types of polyethylene (HDPE, LDPE, and LLDPE) is the branching of the polymer chain of molecules; the more branched out the molecules are, the thinner the plastic. Plastic grocery bags are made of HDPE, which has more branched molecules and consequently lower tensile strength and crystalline form.

Plastic carry bags are used commonly in most parts of India. Following Pie chart shows the amount of polymers being used in our daily life.

Plastic bags are difficult and costly to recycle and most end up on landfill sites where they take around 300 years to photo degrade. They break down into tiny toxic particles that contaminate the soil and waterways and enter the food chain when animals accidentally ingest them. Hundreds of cows die in cities of India every year when they choke on plastic bags while trying to eat vegetable waste stuffed in the garbage. The major drawback of these carry bags is their non-degradability, which has posed a great threat to the environment.

Some of the environmental impacts can be categorized as:

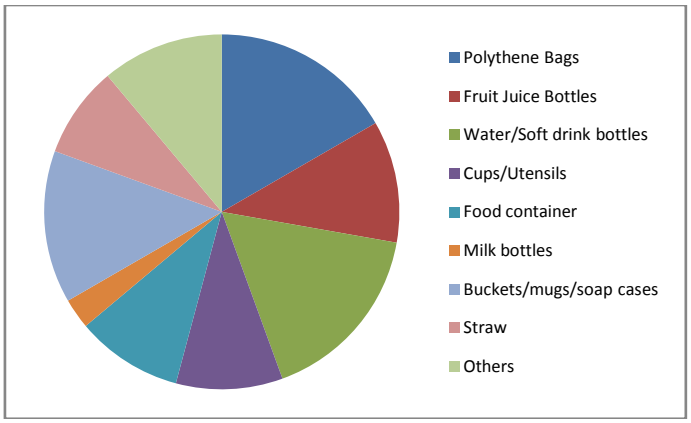

Figure-1
Use of Polymers in Daily Life

Diseases: Disease today in our country - a result of breeding of the various kinds of disease carrying organisms in large numbers- has been made very possible due to the large numbers of non-biodegradable polythene wastes that are widely spread around the city streets. These waste materials act as a breeding place for the various disease carriers like the deadly female anopheles mosquito that spreads malaria, they also rare germs like the cholera germ, which has led to the death of millions of people.

Again burning of these polythene garbage produces hazardous gases. Dioxin is produced during recycling of plastic, which results in different toxic effects to the public health, such as immune system disorder, cancer and reproductive problem etc..

Increased Soil Infertility: The soil has also not been spared by the continued dumping of the poor polythene waste disposal. Lots of land is continually lost to this cause in that; when the polythene bags enter into the soil, they block further passage of mineral salts and oxygen to the soil. These, if properly analyzed are the main components that make up the soil fertility. When blocked, the soil is unable to yield crops properly which can cause several problems to the peasant, "farmers" and consumers.

Blockage of Water Systems: Water is another sector that is highly important to man but has been disturbed by these polythene waste materials and as an after effect, man is affected in various ways which can not be fully listed. Water systems like springs, ponds, rivers etc. are blocked during continued damping of these polythene materials along the shore, the water flow is affected and may be stopped causing floods, disease habitation and unpleasant scenery.

Impacts on Wildlife: Most distressing, over a billion seabirds and mammals die annually from ingestion of plastics. In Newfoundland, 100,000 marine mammals are killed each year by ingesting plastic. However, the impact of plastic bags does not end with the death of one animal; when a bird or mammal dies in such a manner and subsequently decomposes, the plastic bag will again be released into the environment to be ingested by another animal.

Unpleasant Scene: The scenery of the various places where wastes are disposed can only best be defined as improper for human settlement and as such , when wastes are poorly disposed, we end up having the beautiful natural environment losing its beauty, this may scare away many tourists and visitors in an area.

Most of the developed countries recycle the plastic wastes and dump them in developing countries like India. But the recycling process produces many toxic gases. Many people are not aware of the environmental and health hazards of using such material for storage of food and drink along with those of carry bags. Common people are less conscious about the hazardous effect of the carry bags. On the other hand, the educated people who claim to know better, generally carry different materials from the market in carry bags and later dump them carelessly anywhere. Ultimately it creates solid waste problem and pollute the soil.

Dholpur, the district town of Rajasthan, has a total area of 20 sq. kilometers having population of approximately 1.5 lakhs. In this town, like other cities, plastic bags are used frequently for marketing and other purposes. Therefore, in December 2009, a study was undertaken to assess the use of carry bags by different communities of people along with the rate of public awareness of their toxic effects.

Though there are some limitations of these studies, such as inadequate study design, insufficient sample size or some unreliable information, etc. such studies have, nevertheless, generated both concern and awareness among common people, NGOs and health workers.

Objective: The two objectives of this study are, firstly, to present and assess on a scientific basis, the various environmental issues including human health aspects that occur due to the excessive use of polythene carry bags and, secondly, to consider, in view of sustainable development, a number of option to reduce those impacts that need to be addressed.

Material and Methods

Different places of Dholpur such as Lal Bazaar, Jagan Tiraha, Hardeonagar, Hospital Road, Old City, Gadarpura along with Santar Road were selected as models of study. Ten questionnaires were prepared and distributed to different communities of people for personal interview. For evaluation of the public awareness about the use of plastic bags, fifty subjects were selected randomly from different communities such as students, teachers, officers, farmers, businessmen and housewives without considering age, sex and socio-economic status. Survey was completed within twenty days.

Results and Discussion

Like other cities and towns, Dholpur is no exception in respect of the pollution being spread through polythene bags. People from different walks of life use polythene bags for various purposes. It can be observed from table-1 that maximum plastic bags are used by students (70%). The Businessmen and Farmers, as they come from nearby villages loaded with their own jute or cotton bags, uses only 30% of plastic bags. Most of the people i.e 40% using plastic bags fall within the range of 12-18 years as is evident from Table-2. In Dholpur, there exist a few people who have been using polythene bags for more than 18 years.

Table – 1
Distributions of Subjects in relation to the use of carry bags

S.No	Occupation	% of Subjects Taken Randomly	Plastic bag used (in %)
1.	Student	28.0	70.0
2.	Businessmen/Farmers	18.5	30.0
3.	Housewife	20.0	45.0
4.	Servicemen	33.5	40.0

Table – 2
Duration of Plastic Bags used by Subjects

S.No.	Year of Use	% of Subjects
1.	0 – 6	25
2.	6 – 12	20
3.	12 – 18	40
4.	More than 18 years	None

It was observed from the survey that students are using 60% white plastic bags and 30% colored bags. Housewives are using 40% white plastic bags and 65% colored plastic bags (table-3) mainly because the grocers of ladies cosmetics shops are providing them only colored bags. There are different disposal methods used by different groups/sections of people. Table-4 shows that 30% people threw the bags in dustbin, 40% in common places and 20% people burnt these bags. The burning of plastic bags is more prevalent among Nagarpalika Safai Workers, who, after moping the roads and streets, litter the garbage containing almost 30-40% plastic thus causing danger to the environment and also to the morning walkers. 90% of the population belonging to different communities is of the opinion that these plastic bags should be banned immediately. Unfortunately, some businessmen/farmers and housewives had no proper idea about the harmful effect of plastic bags.

Table-5 shows the distribution of consumption of polythene bags in various shops of Dholpur town. The maximum consumption of polythene bags in the town (40 Kgs per day) is done by daily need shops. The colored bags, mainly black one, which is the last stage of recycled polythene, is being used by meat, fruit/vegetable and ladies cosmetic shops. These colored bags are more fatal to human health as well as to the environment. As evident from the investigation, the average consumption of polythene bags per day in Dholpur town is 124 Kgs. making it 3720 Kgs (almost 4.0 tonnes) in a month. This is an astounding figure for a small district town with a population of mere 1.5 lakh. One can imagine the impact of polythene bag pollution at a larger scale.

Table – 3
Types of Plastic Bags used by Subjects

S.No.	Subjects (with %)	White Plastic Bags (in%)	Coloured Plastic Bags (in%)
1.	Student (28.0)	60.0	30.0
2.	Businessmen/Farmers (18.5)	10.0	10.0
3.	Housewife (20.0)	40.0	65.0
4.	Servicemen (33.5)	40.0	25.0

Table – 4
Types of Disposal of Plastic Bags

S.No.	Types of Disposal	Subjects (%)
1.	Common Places	40.0
2.	Burning the Plastic Bags	20.0
3.	Digging Under Surface	5.0
4.	Dustbin	30.0
5.	No proper idea	5.0

Solution of the Problem: In our opinion, the solution of the plastic carry bags menace not even in Dholpur but for the whole nation lies in 3Rs: **R**educe, **R**euse and **R**ecycle. The grocers and retailers of the towns/cities may adopt the following best practices; i. phasing out, over time, plastic bags made of non-recyclable plastic. ii. increasing the amount of recycled content in plastic bags, where available, iii. training checkout staff to build and maintain support for alternatives, including improved bag packing efficiencies to decrease the number of bags issued; increased numbers of items packed per bag; etc. iv. encouraging consumers to reuse carry-out plastic bags and change their behaviour to reduce overall consumption, v. educating consumers regarding the environmental impact of plastic bags, and encourage them to use in-store or curbside recycling services through, for example, the use of incentives, vi. reducing the number of plastic bags distributed by grocers and retailers, vii. expanding the sale and distribution of reusable bags such as canvas and reusable plastic, viii. promoting sustainable practice and educating consumers to reduce their use of plastic bags, increase their recycling, and increase the number of reusable bags

Recycling: Recycling plays an important role in diverting the number of plastic bags from disposal. Recyclable carry-out bags can be made into a variety of products such as new bags, plastic lumber, furniture, laminate sub flooring, hardware items and drainage pipe.

Utilization of waste plastic materials in the highway sector is an efficient alternative to disposal and will reduce the disposal cost

and solving environmental problems. Waste plastic can be utilized in road maintenance by providing an overlay of 25-40 mm to existing bituminous roads.

Reusing: Reuse plays an important role in supporting the initiative's goal to reduce the number of plastic bags distributed for single-use purposes. Grocers and retailers can encourage their customers to use reusable bags regularly. They may offer their customers alternatives to plastic bags such as reusable plastic bins.

It is also important to note that carry-out plastic bags are often used more than once for other purposes such as garbage bags in kitchens (kitchen catchers), lunch bags or general purpose carry bags. Reuse of carry-out plastic bags can eliminate the need to purchase other plastic bag products.

The Polythene Tax: The main reason of plastic bag pollution is that the polybag comes free. Shopkeepers blindly hand out polythene carry-bags, even if somebody buys just a tube of toothpaste or a pencil, little caring that the bag will be in the dustbin after some time. The shopkeepers should include the cost of polybags in the bill along with other billed products, people will then finally take some steps to reduce the dependence on polythene and try and reuse them or carry cloth bags. The government will be able to generate extra revenue through polythene tax and the environment will be less polluted with polythene.

The alternative to plastic bags are paper bags, jute bags and cloth bags. Paper, Jute and Cloth are eco-friendly. Jute bags are most suitable substitute than paper and cloth, because Jute is one of the strongest natural plant fibers which is durable, cheaper than cloth and re-usable. It is a 100 % natural material that consumes carbon dioxide and releases oxygen into the atmosphere. Fabrics made of jute fibers are therefore carbon dioxide neutral and are naturally decomposable. Though paper bags are cheaper than jute bags but are less durable. Recently the Government of Rajasthan has lifted 5% tax on carry bags made of paper, jute and cloth so that grocers as well as retailers will use it more.As usual, there will be 5% VAT on plastic carry bags[3].

Several Indian states such as Maharastra, Dehli, Punjab, Himachal Pradesh, Goa etc. banned the use of plastic carry bags4. The ministry has also asked State Governments to register all plastics manufacturing unit, so that these can be regulated. However, the implementation of the order has been tardy, evident from the large number of polythene bags strewn in every major town and city. Rajasthan has also announced the total ban on all type of plastic bags w.e.f 1st August 2010 and declare the whole state as a polythene free zone.

Table – 5

Average Consumption of Polythene Bags in Shops of Dholpur

S.No.	Kind of Shops	No. of Shops	Daily Consumption of Polythene Bags (inKgs.)		Average Daily Consumption (InKgs.)
			White	Colored	
1.	Medical Stores	60	0.100	0.100	0.200X60 = 12.0
2.	Sweet Shop	50	0.200	0.100	0.300X50 = 15.0
3.	Daily Need Shop	80	0.300	0.200	0.500X80 = 40.0
4.	Fruit & Veg. Shop	40	0.100	0.300	0.400X40 = 16.0
5.	Meat Shop	30	0.100	0.200	0.300X30 = 9.0
6.	Ladies Beautic & Cosmetics Shop	60	0.100	0.200	0.300X60 = 18.0
7.	Others	70	0.100	0.100	0.200X70 = 14.0
	Total Shops = 390			**Total Daily Consumption = 124 Kgs.**	

Conclusion

The use of polythene is not environment friendly. Medical reports find it as an agent of cancer, skin diseases and other health problems. The users are more exposed to these types of health hazards when polythene is used to pack bread, biscuits, potato chips or other food items, some of which may be carcinogenic.

The historic decision for banning polythene carry bags not only ensure environmental benefits for the country, it also provide a great opportunity for generation of more employment and alleviating poverty in rural areas. The rejection of a non-biodegradable product by an entire city/town will probably be a unique example with people's participation. The pro-environment decision can be repeated in other areas of nation building activities in other parts of the world to turn our only planet, the earth, habitable for human beings. Laws and legislations should be put in place regarding the use of polythene bags[5]. The people who are seen using the polythene bags even while moving should be penalized.

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