

## **ISSUES OF NON-BIODEGRADABLE POLYMER IN INDIA**

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### **Abstract**

From past few years there is serious waste disposal problem of non-biodegradable polymer ( NBP) in India. In India 43% pollution is due to use of Non-Biodegradable polymer. It is estimated that 41% NBP is used in packaging and that almost half of that volume is used to pack food products. Most commonly used are poly olefins like polyethene, polypropene and polyvinyl chloride. The purpose of this paper is to provide an overview on the statistics of various NBP and their harmful effects on various components of environment.

### **Key words**

Non -Biodegradable polymer, waste disposal, polyolefins Environmental pollution.

### **Introduction**

Polymer word is self explanatory as poly means many and mer means repeating units that is molecule with large number of repeating units. Polymers are high molecular mass ( $10^3$ - $10^7$  u) substances consisting of very large number of simple repeating structural units joined together by covalent bonds. Depending upon degradation polymers are of two types Biodegradable and non-biodegradable. A biodegradable polymer breaks down completely by natural processes or by microorganisms present in soil, air or water. So that basic building blocks can be used again by nature to make a new form. Synthetic polymer which are used in our daily life are product of petrochemicals not product of nature and can

not be broken down by natural processes. In case of polyolefins as in polyethylene repeating unit is -- which is highly resistant to degradation due to high bond dissociation enthalpy of C-C and C-H covalent bonds, absence of reactive site, lack of chromophore make it inert toward photo and biodegradation, highly hydrophobic. Because of above characteristics PE has been considered almost inert to biodegradation. Some polymers may take 500 years to decompose. Biodegradation of LDPE film was reported as 0.2% weight loss in 10 years. Pollution problem is also associated in recycling and incineration of polymer garbage. There is great disposal problem of non-biodegradable not in India but also at global level. This problem can be overcome only by using biodegradable polymer.

#### **Polymer in India.**

In India polymer consumption grew exponentially in the 1990s. In the decade 1990-2000, total consumption grew twice (12% /year)

#### Polymer (plastic) consumption in India

Table No. 1

Sr. No.	Year	Consumption (Tonnes)
1	1996	61,000
2	2000	3,00,000
3	2001	4,00,000
4	2007	4,00,000

National plastic waste management task force in 1997 projected the polymer (plastic) demand in the country. Table 2 represents the demands of different polymer in India

Table No. 2 Polymer demands in India

Sr. no.	Type of polymer	1995-1996	2001-02	2006-07
1	PE	0.83	1.83	3.27
2	PP	0.34	0.88	1.29
3	PVC	0.49	0.87	1.29
4	PET	0.03	0.14	0.29

Above table shows that there is enormous increase in demand of non-biodegradable polymer in India. After the use of these polymer there increase problem of their disposal. Below table shows that with increase in use of non-biodegradable polymer there is increase in percentage of non-biodegradable polymer in municipal solid waste (MSW) in comparison to biodegradable polymer.

Table No. 3 change in composition of Municipal solid waste with time in percentage a report from planning commission of India.

Year	Biodegradable	Non-biodegradable
1996	42.21	0.60
2005	47.43	9.22
2011	42.51	10.11

Recycling of polymer (plastic)

India recycles about 60% of its plastic compared to world's average of 22%. India has among the lowest per capita consumption of polymer and consequently the plastic waste generation is very low as seen from table  
polymer (plastic) waste consumption

Sr. No.	Description	World	India
1	Per-capita per year consumption of Plastic (kg)	24	6.7
2	Recycling	15.20	60
3	Plastic in solid waste	7	9

In 2014-2015 Plastic consumption in India is one tenth of United States of America.

### Effect of Non-biodegradable polymer

#### 1. Effect on Human :-

These are serious harmful effect of plasticizers(Used to increase plasticity of thermoplastic polymer. Dialkyl phthalates (Such as di-n-butylphthalate di- n-octylphthalate). Thermoplastic are used in our daily life. The plasticizer used in the thermoplastic polymer can leached in human due to continuous use of articles of thermoplastic. These are detected in human and are responsible to disturb endocrine glands. Phthalates works against male sex hormones and are termed as anti-androgens. BisphenolA (BPA) is responsible for heart diseases and diabetes.

### **Effect on Environment :-**

Increased use of non-biodegradable polymer leads to disturbance in ecological balance, losses to biodiversity.

These also leads to air, water and soil pollution.

### **Air Pollution :-**

Incinerating and recycling of polymer releases toxic substances in the air. A large amount of polymer is burnt in incinerator and burning of these chlorine - containing substances releases toxic heavy metals and emit noxious gases like dioxins and furans. These are harmful to respiratory system. Some unburnt hydrocarbon are also released which are responsible for photochemical smog. Recycling of polymer is best way to reduce pollution but during recycling there is burning of polymer which cause emission of and thus increases green house effect.

### **Water pollution :-**

Water pollution by non-biodegradable is of great concern of global as well as of India. Human activities are responsible for a major decline of world's biodiversity . Human activity in form of non-biodegradable polymer in water bodies accelerated the decline of biodiversity. Turtle can dies of starvation as PE block the alimentary canal. Ethylene glycol (plasticizer) is lethal at concentration of 100 mg/L.

### **Soil Pollution :-**

Non-biodegradable polymer is major soil pollutant in these day in form of municipal solid waste(MSD). Polymer degradation by-products such as dyes, plasticizers or catalyst residue, in land fill or compost can potentially migrate to ground water and surface water bodies. These non- biodegradable polymer form a thin film due to which flora dies as a result of deficiency of proper sunlight.

### Conclusion :-

Above mentioned problem of disposal of non-biodegradable is a type of synthetic disaster. Which should be controlled timely otherwise there can be serious consequences. Time has come that every Indian should think and act seriously about the challenges of non-biodegradable polymer. By using better quality biodegradable polymer this problem can be sort out. Now the times has come that nation should think and treat the problem of disposal of non-biodegradable polymer by making extra arrangement and training programs.

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