

USE OF PLASTIC: NEGATIVE EFFECTS ON HUMANITY AND ENVIRONMENT

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ABSTRACT

The use and development of plastic have contributed a significant amount of negative effects on the environment from the aspect of human health habituates and space uses. Plastic is an indispensable innovation of the twenty first century, But the system of throwing plastic waste is endangering our ecosystem. This study investigates the problems, and then highlights solutions and possible solutions. A discussion of the composition of plastic material, general classification, harmful effect of additive material of plastic are presented. A main focus of this study details improvement of the awareness of lesser use of plastic material and safe disposing of plastics so that environment becomes more clean and safe. Another key effort of this study is to make awareness for harms caused by different substance used in plastic industry. Perhaps the most effective combat of plastic's negative effect is in the decreased use and need of plastic. The excessive use of plastic material is causing a serious threats to our environment .Due to toxic nature of material used in plastic formation it is dangerous to health .Some of the plastic pollutants are carcinogenic in nature and there use may be life threatening.

INTRODUCTION

The use and development of plastic have contributed a significant amount of negative effects on the environment from the aspect of human health habituates and space uses. Plastic is an indispensable innovation of the twenty first century, But the system of throwing plastic waste is endangering our ecosystem. The excessive use of plastic material is causing a serious threats to our environment .Due to toxic nature of material used in plastic formation it is dangerous to health .Some of the plastic pollutants are carcinogenic in nature and there use may be life threatening.

COMPOSITION OF PLASTIC MATERIAL

Plastic is a complex material made up of chemicals namely ethane, vinyl chloride, phenol, formaldehyde, styrene, acetylene, benzene, and urea.¹ Plastics are typically organic polymers of high molecular mass. They are usually synthetic, most commonly derived from petrochemicals but many are partially natural. The vast majority of these

polymers are based on chains of carbon atoms alone or with oxygen, sulfur and nitrogen. There is backbone of large number of repeat units together.

TYPES OF PLASTIC

Broadly there are three types of plastic material, thermoplastic, thermosetting and polyamide. Thermoplastic are those polymer which gets soft on heating and become harder on cooling.² Due to this reason this type of plastic can be recycled many times to obtain different desired plastic material. Examples of thermoplastic are polythene, poly vinyl chloride etc. Thermosetting plastics polymer is formed from a reaction between two different types of molecules creating long molecular chains. They are assumed to have infinite molecular weight. Thermosets can melt, solidify and take shape once. In the thermosetting process, a chemical reaction occurs that is irreversible. Examples of thermosets are Bakelite, Acrylonitrile butadiene styrene (ABS), Polycarbonate (PC), Polyurethanes. Polyamide (PA) is a polymer produced by the reaction of the amino group (NH₂) from one molecule with the carboxylic acid group (COOH) from another molecule. The resulting structure is similar to that of a protein. Silk is a natural occurring polyamide and nylon is a synthetic polyamide.³

TOXICITY OF ADDITIVES OF PLASTIC

Pure plastic have low toxicity due to their insolubility in water and because they are biochemically inert due to a large molecular weight. Plastic products contain a variety of additives, some of which can be toxic. The amount of additives ranges from zero percentage for polymers used to wrap foods to more than 50% for certain electronic applications. Following additives used in plastic making -

Fillers- improve performance or used as reinforcing agents and or reduce production costs. Fillers are minerals in origin, eg. Chalk, ground form of thermosets.

Plasticizers - are added mostly in rigid organic polymers to use them for particular applications. For example plasticizers like phthalate are often added to brittle plastic like polyvinyl chloride to make them pliable enough for use in food packaging, toy and many other items. Alkylphenols chemical is also of potential concern.

Stabilizers -these include fire retardants to lower the flammability of the material. for example Hydroquinolines, phenols, bisphenols are used for increasing resistance to environmental oxygen.

Colorants- are common additives, although their weight contribution is small. Hydroquinone, chromium and copper are used as colorants. They can cause cancer and many other diseases.

Catalyst- Antimony, Zn, Cadmium and Magnesium.

Bisphenol Primary building block of polycarbonates. Bisphenol A (BPA), is an estragon-like endocrine disrupter that may leach into food . A more recent study suggests that even low level exposure to BPA results in insulin resistance, which can lead to inflammation and heart disease. WHO's International agency for Research on Cancer (IARC) has recognized vinyl chloride, the precursor to PVC, as a human carcinogen.⁴

ENVIROMENTAL HAZARDS OF PLASTIC MANIFRACTURE AND PLASTIC WASTE

Chemical bonds of plastic make them so durable tend to make them resistant to most natural processes of degradation. Many of the controversies are associated with the additives used in plastic. Below are mentioned some of the environmental hazards of plastic manufacture and plastic waste.

Generally, 1000⁰C Temperature is required for production of plastic. Production of plastic from crude oil requires 62 to 108 MJ of energy per kg. This is much higher compared to many other materials eg. Production of paper from timber required 25-50 MJ per kg. According to German environmentalists 17 kg SO₂, CO, Nitrogen, hydrogen gases are released into the atmosphere in the production of plastic. Some toxic elements are also mixed into the water. Workers in the plastic factory are more prone to cancer, eye and respiratory problems. Production of polystyrene contributed to the ozone layer.

The plastic used for packing is a measure threats to environment. In developed countries, about third of plastic is used in packaging. In India, this ratio is reportedly 42% [9]. Most of the food items are marketed in polythene and plastic wrappers. Vegetables and fruits are marketed in polythenes. Plastic and thermocole cutlery are excessively being used in parties and to arrange feasts.⁵ Traces of toxic additives can leach out of the product. Some compounds leaching from polystyrene food containers have been proposed to interfere with the hormone functions and are suspected human carcinogens.

RECYCLING OF PLASTIC WASTE

Even at high temperature microorganism like hepatitis B, AIDS, Salmonella, coli are not destroyed. Person who uses plastic may fall ill with various destroyed. Recycle of plastic is possible but this action is expensive due to labour expenses on sorting and energy expenses on sanitizing of recyclable plastic. Recycling certain types of plastic can be unprofitable as well. For example, polystyrene is rarely recycled because it is not cost effective.⁶ Unrecyclable plastic wastes are typically disposed of in landfills or incinerated. Due to this high coast recycling of plastic waste is avoided by countries.

DISPOSAL OF PLASTIC WASTE

1. Throwing of plastic waste on garbage collection place- At garbage collection place, lots of plastic waste is seen. In India about 20-25% waste in of plastic. All municipal waste are taken to fields and dumped there. Organic waste mixed with plastic waste is also not in the condition to be recycled for nutrients and use as manure. Organic nature's of garbage becomes toxic due to colorants and plasticizers of plastic. These chemicals

react with the acid or basic nature of organic waste and create soil pollution. They will come into the food chain and becomes problematic for human as well as animal health. Fragmented pieces of plastic were observed in the guts of sea birds in the 1960's. In nearby villages of district Saharanpur, pthallic acid was observed in underground water. These areas become now cancer prone.

2. Dumping of plastic bags with kitchen wet waste- In India, people wrap kitchen wet waste in polythene and throw out from home. Methane gas is produced from organic waste due to anaerobic atmosphere under polythene. Methane gas absorbs infrared rays 20 times more than CO₂ resulting in global warming. Biodegradable plastic have also caused methane emissions.

3. Burning and Incineration of plastic waste- Burning of plastic waste like plastic wrappers and plastic cutlery is also seen in front of shops and railway lines. Open air burning of plastic occurs at lower temperatures and normally releases toxic fumes of polychlorinated dibenzo-p-dioxins, a carcinogen (cancer causing chemical). Toxic fumes can cause allergy, eye and respiratory problems. Due to petroleum, if plastic material is incinerated, it increases carbon emissions. Burning of polystyrene releases chlorofluorocarbon which contributed to the depletion of ozone layer.⁷

4. Landfill of plastic waste- If plastic is placed in a landfill, it becomes a carbon sink. Rainwater does not absorb and become the part of aquifer where plastic waste is thrown or landfill. This practice falls down water level.

MEASURES TO SAFE GUARD ECOSYSTEM FROM PLASTIC WASTE

- Instead of using carry bag (polythene) to purchase grocery, vegetables and fruits cloth carry bag should be used. This practice will minimize the plastic waste.
- Instead of using Plastic and thermocole cutlery, paper cup plates should be used to arrange parties or at tea stall. This practice will minimize plastic waste.
- The practice of sending paper cottons from Institutions to the paper factory must be adopted.
- People must be educated not to throw plastic waste with wet garbage.
- People must be educated not to burn plastic waste.
- Plastic waste of plastic wrappers must be send to plastic factory for remoulding into newer products.
- People must be educated for all dangers of plastic pollution.

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