

9. Plastic pollution: A Global Challenge and it's Prevention

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Abstract:

Plastic is one of the most important goods to the modern civilization as well as plastic pollution is a great headache to us. This is the inventions of people who are always looking for new and better content because plastic fulfill the desirement of cost-effective good quality products and that is why they are braided today. Through all over the world plastic is used in many ways as bottle, carry bag, toy and also another type of goods. According to the survey report of plastic waste only nine percent (9%) of the nine billion tons of plastic in the world ever produced has been recycled. Plastic degradation closes to impossible because in burning of plastics toxic gases blow off, it takes a very long time to degrade but till then plastic cannot be completely destroyed. In case of through out to seas or oceans it turns into micro plastic, but it does not leave to create pollution. The world has already started to suffer from plastic pollution, as effects almost species are on the way of extinction. Due to plastic waste affect 84% of sea turtles, 44% of sea birds, and 43% of all marine mammals out of 267 suffering from starvation, suffocation, and other critical conditions. So, to get rid of plastic pollution, people should have to pay more attention to the friendly process to meet their requirements otherwise one day will come when there is no footprint of human beings on the earth.

9.1 Introduction:

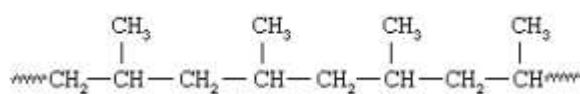
Plastic is a groundbreaking invention of science because plastic is such a substance that is very light in weight, limitless longevity, low-cost products and contain multipurpose utilization properties. Due to these qualities the use of plastic has spread very fast through all over the world. The production and gathering of plastic carry bags has been started after the 2nd World Wer and now nothing can retard its motion. From bottle cap to doll, from cosmetics to electronics and from chocolate rapper to grocery packets everywhere plastic spreads its kingdom. Now the days of modern technologies and transport systems people able to reach from peak of mountain too deep of ocean and everywhere they through plastic rappers, bottles, carry bags etc that cause gathering here and there. Plastic pollution is the gathering of plastic materials in the Earth's environment that adversely affect humans, wildlife and wildlife habitat. Everyday approx. one million tone plastic is removed from houses, industries worldwide and it is a common thing to have unnecessary plastic bags in roads and drains but there is no process to destroy this large amount of plastic. They exist depending on their precursors and method for their polymerization.

The main contributory factors to the problem of plastic pollution are fishing nets, plain old trash, disposing of plastic and garbage, and over-utilization of plastics. Plastic that acts as pollutants can be classified into big to microscopic according to their sizes as - Micro debris, Macro debris and Mega debris, meso debris. Mega and micro plastics are generally used in manufacturing packaged products. Due to fishing activities some type of plastics are accumulated in the remote islands those are called micro plastic, meso plastic etc. In India per year around 5.6 million tons of plastic is produced as garbage in which about 70% is considered as waste which have no use. This limitless use and reckless throwing of plastic anywhere create problems in drainage of water, damage soil quality that causes agricultural hazards and it also cause a great impact on the ecosystem. If the modern civilized people pay no attention on this severe problem, the day is not so far when human beings will be in the list of extinction.

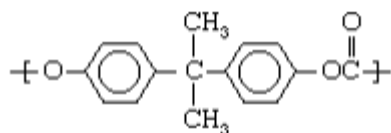


9.2 Chemistry of Plastic:

Plastic is a polymeric substance. Plastic has the ability of being molded by applying heat and pressure. This property of plasticity, often found in combination with other special properties such as low density, low electrical conductivity, transparency, and toughness, allows plastics to be made into a great variety of products. The different types of plastics are Polyvinyl chloride (PVC), Polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET) etc. In the field of chemistry plastic polymer is classified into two groups due to their polymeric chain - Aliphatic polymer and Heterochain polymer. In aliphatic polymer its backbone is made up with linear carbon chain.



And in the Heterochain polymer the backbone is made up with aromatic ring with the attachment of nitrogen, sulfur or oxygen molecules.



Most plastic is formed from the end product of petroleum which main component is lipid. But in long ago the presence of lipase enzyme producing microorganisms was discovered that means plastic should be degraded naturally. But in reality, its opposite matter is happened. So why plastic is not biodegradable which causes pollution? Most of the plastic is derived from propylene that's a simple chemical component of petroleum.

When it is manufactured in industries, propylene is mixed with some other needed compounds and heated with catalysts in very high temperature, by which individual propylene monomers bind together and form long polymeric chain of very strong carbon-carbon bond.

This mechanism is totally unnatural, so plastic is not biodegradable. To degrade this polymer when it is burned its compositions form toxic gaseous substances that cause air pollution. If polymer would be made up with peptide bonds, it would never cause pollution, but industrialists avoid it because peptide bond is degradable by microbial actions, then self-life of the product would be very limited.



9.3 Causes of Plastic Pollution:

Plastics are the most hazardous non decomposable material. In modern world use of plastic increases tremendously as well as the rate of pollution also increases vulnerability. There are lots of causes of plastic pollution, few are listed below-

9.4 Use of Plastic as Carry Bag:

As I mentioned earlier the composition of plastic vary and the chemical structures of plastic and its thickness also different.

Fish is a protein rich food source fishing is a source of income. There are several types of net use to catch the fish from water bodies. Most of the rope and net that uses for fishing activities are made up of plastic like nylon to make the equipment durable. This plastic net sometimes cuts into the water bodies and effects on coral reefs. Some of plastic that release several toxins which affects the ecosystem of water and indirectly effects on human being too. Largest ocean-based source. Plastic contamination which is discarded fishing gear traps and nets are included, and it is estimated up to 90% of plastic debris in some areas. Continental plastic is mainly from water runoff or direct stream.

9.5 Disposition of Household Plastic Garbage:

Nowadays from day to night we use ennumerous things made up of plastic. We can say plastic is our all-time usable material in different way. It is non disposable, do not break down cause's environment pollution. The polymer of plastic takes long period of time to degrade. The decaying of plastic is a long process. A plastic container takes about 450year to degrade, a nappy takes 400years, a plastic foam takes 50years. So, the plastic wastes that mixed with soil causes soil pollution as a result day by day agricultural field get polluted. Burning of plastic causes worst effect on environment.

It releases a highly toxic chemicals which deadly effect on human health. When this plastic mixed with groundwater, the water become highly poisonous. Most of the area now contaminated by plastic toxin. As a result, people suffer by numerous illnesses, Lifespan decreases. When rainfalls, all these plastic wastes toxin leaches everywhere. Oceans have susceptible adverse effects on plastic wastes that causes marine ecosystems hamper. We consume this poison fish for nutritional source, but we don't think about the pollution that happened earlier which effect on fish.

9.6 Plastic in Soil:

Plastic waste is usually dumped in landfills. There is highly chance of formation of highly chemical in the soil. When these chemicals are leaches inti underground, water quality reduces. The wind contributed to plastic pollution, which means plastic wastes unknowingly spread from another place to another place.

Plastic wastes are coming in contact with trees, fences, towers, poles, traffic lights, roof etc and suffocate them and leading to their death . Still now there are number of open garbage dump in the world even in developed country too. That leads to pollution and causes environmental stress. Plastic pollution of land poses a great worst effect on plant , animal and human beings.

Chlorinated plastic release highly dangerous toxic which can then the seeps into land and also in groundwater.

Thereafter water become polluted . Such toxic chemicals are released from plastic waste interact with water entered in the soil, it makes the soil barren and affects tree growth.

Landfill located near the ocean often contributes to the ocean debris because the content is easily swept and is transported by sea or by sea waterways like rivers and streams. Marine debris sewage can also result from water that is not has been treated efficiently.



9.7 Effect of Plastic Pollution:

9.7.1 Environmental Effects of Plastic Pollution:

Plastics can be composed of major toxic pollutants that have potentiality and important in environmental pollution in the form of water, air and land. Plastic is a non-biodegradable substance that creates a disaster on our beautiful nature results long- terms problem for animals, humans, and plants etc. Too much use of plastic is responsible for the changes of wind, ocean currents, urban areas, trade routes and coastlinegeography. The huge population of human is responsible for this pollution. Generally, plastics are found in the towns, crannies of cities, enclosed regions etc. Plastics pollution effects on our natures are ground water pollution, land pollution, air pollution, killing of animals, distraught of food chain etc.



9.7.2 Health Problems Due to Plastic Pollution:

Plastic pollution take place when plastics are collects in a place begins to a bad effect on the beautiful environment and then start problem for wildlife, plant and also in the human growth. These pollutions are also involved in local animals, decreasing in humans, destroy the plant life etc. Plastic is an unbelievable useful material in our society and daily life which can impact a bad role in our life.

Plastic is also breaking hormonal growth and carcinogens. The chemicals that are used for the preparation of plastics have some known human health effects which encompasses reproductive, neurological, immune system impairment, cancer, leukemia, genetic impact, developmental toxicity and also impact in the newborn baby like low birth weight. Day by day huge production of plastics impact in water, air, soil and many other pollutions. The application of plastic products generally leads to the ingestion of huge amount of both toxic substances and micro plastic particles with carcinogenic or endocrine disrupting effects. This is also connecting with the human health & hygiene.

In this beautiful nature, the micro plastics are insert to our body through direct exposure which include necrosis, dizziness, apoptosis, diabetes, cardiovascular disease, stroke, unconsciousness, arthritis etc.

9.7.3 Prevention:

Plastic wastes increases day by day with high rate. Nature suffocates in pollution. A global plastic pollution will wait in future. So, from now we have to take prevention against it. We have to protect us and protect our environment. We should take action for a plastic free environment; we can breathe fresh air and be healthy. Some measure reducing plastic pollution are following

9.7.4 Reuse:

We should avoid the use of plastic in daily life. There are several options instead of plastic. We can use wooden bottles in place of Plastic, it is eco-friendly as well as good for health. We should we paper carry bag in place of plastic. In shop we should choose reusable container for packaging instead of plastic bag. If we ignore the use of plastic little more, one day we may achieve a plastic free environment.

9.7.5 Recycle:

Plastic can be recycled by using it into a new form in new product. Recycling of plastic means still it's a plastic because plastic is not easily degradable. So, by recycling the load of plastic never decreases but there is a chance to balance the amount of plastic instead of increasing it. Here a problem arose that all types of plastic can't be recycled to new product .so the best way to reduce plastic is by avoiding the use of plastic.

Proper education: Education is the most important solution of almost all the problem. If we have knowledge about the harmful effect of plastic, then we might avoid it.

In the business field it is very important to aware against the harmful effect of it. So that they can choose a replaceable option of plastic. Each of us should have knowledge of plastic bad effects.

Government Intervention: Government should be more aware to the plastic wastes. If government, make a law against plastic general people definitely follow it. Government of many countries already looking after it. There are many antiplastic association who aware people. By different ways. They camp in locality.

9.8 Conclusion:

Plastic is such a daily used essential commodity that the human beings neither can stop its use, nor they can save their existence if they will not stop plastic pollution. Evolutionary human beings are the most powerful and knowledgeable creature in the earth, nothing is impossible to them but this nonliving material, plastic changes many things of this modern civilization and now many critical diseases are occurring only for the cause of plastic pollution. So, it can be concluded that the industrialists are manufacturing more and more essential items, but they must pay attention on the recycling of wasted plastics. Otherwise, there will be no existence of human creatures on the earth.

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