

# Plastic Explosion



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## ***Editorial***

*Plastic has had more of an impact on the history of society than almost any other material. Plastic has changed everything from industries to daily life. It has left an indelible mark on our world. But this effect doesn't come without a cost. We are on the verge of an environmental crisis, and the growing amount of plastic pollution is a threat to our planet's health and wildlife that has never been seen before.*

*On the occasion of World Earth Day, with the theme "Planet Vs Plastic," we present to you "Plastic Explosion." This comprehensive book delves into the multifaceted dimensions of plastic—from its evolution and chemical composition to its pervasive presence in our ecosystems and the urgent need for solutions. Within these pages, esteemed researchers, scholars, and advocates offer their insights, analyses, and visions for a plastic-free future. From exploring the origins and journey of World Earth Day to examining the intricate interplay between plastics and biodiversity, each chapter contributes to a deeper understanding of the complex issues at hand.*

*"Plastic Explosion" is not merely a catalogue of problems; it is a testament to the power of knowledge, innovation, and collective action. As guardians of life on Earth, it is incumbent upon us to confront the challenges posed by plastic pollution with resolve and ingenuity. Through informed discourse and concerted efforts, we can forge a path towards sustainability and stewardship of our precious planet. This book serves as both a call to action and a beacon of hope. It is a reminder that while the threats of plastic pollution loom large, so too do the opportunities for positive change. By coming together as global citizens, we can transcend the plastic dilemma and build a future where harmony between humanity and nature is not only possible but inevitable.*

*As we embark on this journey of exploration and enlightenment, let us heed the words of Rachel Carson: "The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction."*

*May "Plastic Explosion" inspire you to join the movement towards a healthier, more sustainable world for generations to come.*

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# Recycling of Plastics for improved Environmental Sustainability

- Dr. Prajakta Kadu

## Introduction

Plastic is a synthetic or semi-synthetic organic compound made up of petroleum. Plastics by their versatility, inexpensive, durability used in packaging, textiles, carpeting, toys and construction materials. Every year production of plastics has been sharply increased. In the year 1950, worldwide production of plastics was just 2 million tons. As of today over 450 million tons of plastics is produced in world. Plastic pollution is formed due to waste disposal, industrial activities, construction and illegal dumping.

Due to pollution of plastic waste, it will cause harm to marine life and terrestrial ecosystems. In the mid-20th century, production and consumption of plastics rapidly increased, posing challenges to global sustainability efforts. Nowadays, plastic pollution has emerged as a significant threat to the environment, biodiversity and human health. To overcome this challenge we need to understand the recycling of different types of plastics.

## Types of plastics, uses and recycled:

Plastics are found in different varieties, shapes, colors and types. All types of plastics are different from each other and have different uses. Some types of plastic are reusable, recycled and others need to be disposed of in a different way. The seven different types of plastics, their uses and recycling process are given in the following table:

<b>Types of Plastics</b>	<b>Production</b>	<b>Applications</b>	<b>Recycled Process</b>
<b>Polyethylene Terephthalate [PET/ PETE]</b>	It is produced from ethylene glycol and terephthalic acid derived from petroleum and natural gases.	It is used in Food containers, beverage bottles, textile or pharmaceutical.	It can undergo chemical recycling, easily melted and reshaped into carpets, clothing.
<b>High-Density Polyethylene [HDPE]</b>	It is produced from ethylene derived from petroleum and natural gases.	It is used in toys, detergent bottles, buckets, pipes.	It can undergo chemical recycling, effortlessly melted and remoulded into Park benches, playground equipments. It is more costly and less prevalent.
<b>Low density polyethylene [LDPE]</b>	It is produced from ethylene and other polymer structure makes it less dense.	It is used in plastic bags, squeeze bottles, coating for paper cups and cartons.	It can be mechanically recycled into lower-quality products like garbage bags, furniture. Its chemical recycling process is not widely applicable.
<b>Polyvinyl chloride [PVC]</b>	It is produced from vinyl chloride derived from ethylene and chlorine.	It is used in pipes, wires, cables, medical bags window frames and tubing.	It can be mechanically recycled into lower – quality products like mats, flooring. Its chemical recycling process is complex and expensive.
<b>Polystyrene [PS]</b>	It is produced from styrene, a liquid hydrocarbon derived from petroleum and natural gas.	It is used in disposable items like plates, cups, cutlery, egg cartons and packaging peanuts.	It can be mechanically recycled into lower – quality products like picture frames, coat hangers. Its chemical recycling process is complex and expensive.

<b>Polypropylene [PP]</b>	It is produced from propylene, a by-product of petroleum refining.	It is used in bottle caps, yogurt cups, straws and automotive parts.	It can be mechanically recycled into lower – quality products like battery cases, trays, flower pots. Its chemical recycling process is not widely applicable.
<b>Miscellaneous Plastics</b>	It is produced from different or mixed resins. Eg. Polycarbonate, polyethylene terephthalate glycol, bioplastics and acrylonitrile butadiene styrene.	It is used in compact discs, baby bottles, sunglasses and nylon.	They are rarely recycled due to identification, separation and processing. Some of these plastics can be mechanically or chemically recycled but not widely applicable or economical.

**Consequences of plastic pollution:** Plastics are non-biodegradable waste to oceans in which marine life choked with plastic debris. Floating plastic threatening biodiversity and the food web. Animals ingest plastic waste and suffer from digestion, infections and internal injuries. Marine birds and fish becoming caught in plastic packaging which can cause painful wounds and even death. Plastic pollution also kills our coral reefs which are an important part of our biodiversity. Micro plastics have bad effects on human health by affecting our immune response or absorption of toxic chemicals.

**Global Initiatives and Policy Responses:** Governments, businesses and civil society enact policies and initiatives aimed to control plastic waste. Policies include investment in waste management infrastructure, bans on single-use plastics, recycling of plastics to mitigate the flow of plastics into the environment. By recycling and reusing plastic waste decreases the amount of waste.

**Solutions:** Reducing plastic consumption, developing new recycling technologies, developing alternative packaging techniques through material science. The plastic-

free lifestyles required widespread awareness, eco-friendly product labeling, education campaigns and community - driven initiatives. Initiatives in developing biodegradable plastic and ban on plastics.

**Conclusion:**

Plastic is a valuable material but poses serious challenges for the environment and biodiversity. By recycling plastics we can reduce plastic waste, conserve natural resources and protect the Environment. Recycling plastics is not enough to solve the plastic crisis but we also need to reduce our plastic consumption and choose more sustainable alternatives. The consequences of plastic pollution are far- reaching and multifaceted, encompassing ecological degradation and economic burdens.

The fight against plastic pollution is a collective Endeavour that requires concerted action at all levels of society. By embracing innovations, policy reform and individual responsibility, we can safeguard the health of our planet and preserve its biodiversity for future generations. Together we work towards a world where no longer threaten the health of our biodiversity, but instead, contribute to a thriving planet for generations to come.

