PLASTICS: A BRIEF REVIEW OF ITS DISASTERS AND DEGRADATION TECHNIQUES

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RESEARCH HIGHLIGHTS
This review article focuses on the growth of Platic industry, the disasters caused by it and an overview of degradation mechanisms. Plastics being considered the benign substances came into headlines when their presence was first detected in the food chain. These plastics can persist in the environment for hundreds of years. Degrading these persistent pollutants is of major concern for many scientists across the globe. Incinerating plastics is one option but it has many environmental consequences. Besides, bioremediation is the process that many scientists are interested in, as different microbes have the ability to degrade plastics at different rates. Research is needed to come up with the economical and eco-friendly approaches, fast enough to degrade tons of plastic with minimum effect on the environment. Major concern is not only degrading plastics but also minimizing its use and coming up with alternatives that are not only eco-friendly but also cost effective.

Keywords: Global Convention on Plastic Pollution: Banning the Single use Plastics: Working on Awareness Programs: Recycling and Zero-Waste Concept.

RESEARCH OBJECTIVES
Purpose of this review is to summarize the major environmental concerns caused by plastic pollution, abridging the different degradation techniques and proposing ideas for reducing the plastic waste and moving towards the zero-waste concept.

Increased industrialization due to rapid population growth has affected our environment in one way or another. In a today’s world, accessing clean water, air and even food is almost impossible. Everything on the Planet Earth is contaminated in one form or another. A wide variety of contaminants has been classified based on their chemistry and toxicity. Plastics being persistent among all types as it takes hundreds of years to degrade. Plastic pollution is a huge and mounting problem and it demands a similarly ambitious and influential solution. As ‘human-caused climate change’, this issue also needs the same consideration and it should be approached in the similar way. Plastic pollution is killing our planet! It’s choking our oceans by making plastic gyres, entangling marine animals, poisoning our food and water supply, and ultimately inflicting havoc on the health and well-being of humans and wildlife globally. So purpose of the review is to highlight the problem and propose some alternatives and solutions.

INTRODUCTION
The importance of plastics can be seen in everyday life as it has become a very crucial part of our living systems. Its production has increased from 0.5 million tons in 1950 to 260 million tons in 2007. This increase in usage, especially throwaway items of packaging, makes 37% of all the products of plastic(2).

Plastics are one of the most persistent forms of pollutant that takes hundreds of years to degrade. Scientists around the world are increasingly discovering wildlife that has been killed after feasting on plastics or becoming entangled in plastic and choked to death. The literature on marine debris leaves no hesitation that plastics make-up most of the marine litter worldwide(3). The first ever report on marine environment pollution by plastics was documented about 50 years ago, less than two decades after the rise of marketable plastics production, when less than 50 million metric tons were produced annually. In all major marine habitats, plastic debris has been detected ranging from microns to meters(5). Plastic has adverse effects on marine organisms, especially microplastic having size less than 5mm, has been assessed. It has been concluded that microplastic may transferred toward the circulatory
system(1). Due to this, other organisms which rely on the marine life for food are also affected hence creating a primary effect on food chain (7,8). According to a report published in Guardian on October 22nd 2018, microplastics of 9 different types were found in stool sample of humans, ranging from 50-550 micrometers. Polypropylene and polyethylene terephthalate are mostly found plastics.

In last few years a remarkable pressure on disposal of plastic waste has been observed on authorities. Some technological advancement has been made as it is shown that some type of plastics such as thermoplastic which is derived from polyolefins are biodegradable through photo degradation(11). Many fungi are also able to degrade plastic by penetrating in the polymer solids through fungal colonization(10). In 1991 a team investigated the ability of lignin-degrading microorganisms to attack degradable plastics in pure shake flask culture studies(6). Similarly, Green algae, blue-green algae and diatoms were isolated from the domestic polyethylene bags. Green microalga were the most leading in degradation process(4).

It has been found recently that the larvae of greater wax moth (Galleria mellonella) can degrade polyethylene by chewing it off(9).

**CONCLUSIONS**

Scientists around the world have been working long to degrade plastics, using special catalysts to induce the chemical reactions and thus degrading polymer chains. But it’s tough, and only very recently have they started to see progress. More research is needed for such organisms and enzymes that hold greater potential for plastics biodegradation. Emphasis should be on an economical and ecofriendly approach in order to get rid of millions of tons of plastic that lies in the environment unaffected. It’s time to think about the plastics, banning the single use plastics especially, working on awareness programs, thinking about the recycling and going towards the zero-waste concept.

**REFERENCES**