Reduction of Plastic usage in India: Analysis of Alternate Solution

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***Abstract*—Plastic is one of the most commonly used materials worldwide. Humans are still in quandary over the use of plastic. As awareness of the harm of plastic usage increases in India, the Government and companies are searching for cost effective ways to reduce the use of plastic. To reduce plastic usage is challenging in households and many industries, especially in food and packaging industries. In this paper, we have discussed the alternate solutions to replace plastic products in households and in food and packaging industries. Though these products are more expensive than plastic products, but "Saving Planet" is more important than "Saving Money". We have also discussed the role of biodegradable plastic and why it's not a feasible solution. Furthermore, we have reviewed many plastic replacement products like Bamboo Toothbrushes, clay bottles, edible cutlery etc.**

Keywords Biodegradable Plastic; Biotransformation; Bioplastic; Four-Rs (Reduce, Reuse, Recycle, Redesign)

I. INTRODUCTION

Single-use plastics or disposable plastics are mainly used for items intended to be used only once before they are discarded or recycled. In our daily life, these include items like grocery bags, food packaging, bottles, straws, containers and cutlery. [1] According to the Environment Ministry, about 20,000 tons of plastic waste are generated every day in the country, out of which only 13,000-14000 tones are collected. And the problem, up to some extent, lies in the inadequate collection and recycling systems.

During his Independence Day speech in 2019, PM Modi encouraged people to stop using plastic products from October 2 and make India a plastic-free nation [2].

II. ANALYSIS

Upon its arrival, biodegradable plastics were suggested as a good replacement for disposable plastic products used in the food and packaging industry. Biodegradable plastics are plastics that can be decomposed by the action of living organisms, usually microbes, into water, carbon dioxide, and biomass [3]. But their degradation is not as easy as it was depicted. Biodegradable plastics are called the replacement of plastic but to break down, it requires the 130-degree heat of an industrial composter [4]. Polymateria, a UK firm, is working on the problem of Biodegradable and compostable plastics.Polymateria's mission is to advance science to help nature deal with plastic pollution. The scale and visible nature of the plastic pollution problem has captured grassroots imagination like no other environmental issue.

This firm, Polymateria, fully takes up the circular economy and supports the reduction of single-use plastic, the reuse of long-life durable plastic and a more effective recycling system. They work on 4th 'R' (Redesign) and supports the 3 'Rs' (Reduce, Reuse, Recycle) They transform plastics at the point of manufacture to ensure that the products biodegrade in the natural environment after their useful life[5]. This technology is called Biotransformation.

III. ALTERNATE SOLUTIONS

Liquid wood

It is a kind of biopolymer (otherwise called bioplastic);
fluid wood offers both the appearance and capacity ofconventional plastic, however without the destructive ecological impacts. The base of this material is lignin, a side-effect that originates from paper factories. To make fluid wood, makers take lignin and join it with water before setting it in a domain with extraordinary warmth and weight. This changes the lignin into a composite substance that is adaptable enough for the maker to frame into any shape, yet additionally profoundly strong. As of now, researchers from Germany have utilized fluid wood to make kids' toys and compartments for speakers [6].

Starch-based plants

Throughout the years, boring plants have gotten another famous hotspot for practical plastics. The most regularly utilized material is corn, which producers can process into a polyester called polylactic corrosive (PLA). As its name proposes, this material is produced using the lactic corrosive delivered when corn experiences wet processing. Utilizing PLAs, makers can make for all intents and purposes any item or bundling that would regularly be made of plastic. These polymers are especially advantageous on account of their capacity to completely biodegrade inside a range of 47 days under modern treating the soil conditions. These are also free from harmful vapor when decomposed [6].

Chicken Feathers

The United States discovered that discarding chicken plumes is an issue; however with the assistance of development, they can be a material valuable to make a water-safe thermoplastic. Chicken quills are composed of keratin, an extreme and solid protein like plastics [6].

Along with the above plastics replacement solutions, we should take a pledge to reduce plastic usage in today's life. One can choose the following steps:

1. **Desist ourselves from using plastic shopping bags:** Instead of asking for a plastic bag from a shopping or grocery store, take your own clothing bag.
2. **No Plastic straw:** Kids are the biggest consumer of plastic straw. Parents and teachers should educate children about health and environmental hazards of using plastic straws
3. **Say 'No' to plastic bottles:** Try to use reusable water bottles instead of plastic bottles.
4. **Reduce e-waste:** The e-waste like CDs, DVDs, pen drives etc also increase the plastic waste in the world. We can aim to repair our e devices instead of buying new ones (if possible).
5. **Don't litter:** Try not to litter plastic or its product especially near sea and rivers.
6. **Nature based Products:** There are many products, like clay bottles, bamboo toothbrushes, edible cutlery, wheat straws, mitticool fridge and many more are available in the market to replace plastic products.

IV. CONCLUSIONS

Keeping in mind the adverse effect of plastics on our environment, People around the globe come together to make the world plastic-free. It is time to find the solution, whether its motivation or innovative ideas, to control this problem. Government has already started the waste segregation movement. Now it should focus more on waste management in which collection and recycling is involved. It is the responsibility of every citizen to take part in the Swach Bharat Abhiyan and Plastic-Free India movement.

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