Chapter 20
Challenges and Factors in Plastics Reutilization/Recycling: A Review

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ABSTRACT

Plastics are used worldwide due to the low price, lightweight, and long-lasting availability. It can be molded into different products. Therefore, the invention of plastics has been increased significantly over the last 50-60 years. Several environmental problems are generating due to plastics used across the world. This kind of observation indicates that plastics are not sustainable. It is accumulating in landfills and natural locales due to the stability of the polymers involved. This chapter discusses the structure and uses of plastics. Plastics recycling is a very challenging duty in waste management. This chapter explores the factors affecting the plastic recycling in detail. This chapter also explores the plastic recycling methods and challenges during plastic recycling and deliberates more briefly how the government sector is working to clean most of the plastic waste from landfills to recycling over the next periods. In the last, this chapter highlights the plastic effects on the environment and how we can use again through recycling.

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INTRODUCTION

Plastics are organic polymers which are derived from petrochemicals and contain high molecular mass. Generally, we can say that it is a group of materials of high molecular weight chains with a carbon backbone. These materials are defined as a monomer which relates to its repeated units to make a polymer. The class of mouldable polymers which can be deformed irreversibly without breaking is known as plasticity (Achilias, 2006; Watanabe, Yasuaki, Takashi, Hiroshi, Toshiyuki & Katsuhiko, 2009). Plastics are a material which consists of an extensive range of synthetic or semi-synthetic organic compounds that can be easily changed into solid substances.

Plastics are produced from fossil oil and gas. Annually 4% of petrochemical is using in the manufacturing of plastics. The energy which is required to produce plastics comes from the regular consumption of fossil fuel (Onu, Vasile, Ciocilteu, Iojoiu & Darie, 1998; Williams& Williams, 1998). Plastics are reducing the use of fossil fuel. Replacement of heavier conventional material like steel by plastic is an example of the reduction of fossil fuel.

Plastics can easily be molded in other substances, and it makes it more useable by the people. People are using plastics due to the low price, low weight, and durability (Achilias, Roupakias, Megalokonomosa, Lappas & Antonakou, 2007). It is also using to substitute heavy materials with weight reduction which give results for 3-7% improvement in fuel efficiency. There are so many examples where plastics are using like packaging, pipes, cable coated materials, structural materials, and agricultural films. The use of plastic is breaking the record every year (Xie, 2008; Zhao, 1996). The plastic industry has been developed due to the different routes for the development of polymers from petrochemical sources. The estimation of the production of the polymer is almost 260 million metric tons per annum which contain synthetic fibers, thermoplastics, and thermoset plastics. Thermoplastic resins are two third part of this production, and globally it is increasing almost 5% per annum (Westerhout, Waanders, Kuipers,& Swaaij, 1997; Yoshioka, Furukawa, Sato & Okuwaki, 1998). Biodegradable plastics are made of bioplastics; bio-plastics are made up of renewable raw materials. Biodegradable plastics can decompose in the environment naturally by a microorganism (Xiao, Ni, Chi, Jin, Xiao, Zhong & Huang, 2009).The advantage of biodegradable plastics on conventional plastics is the manufacturing process. During the manufacturing process, carbon, methane and other forms of pollute does not release when biodegradable plastics burned or recycled. But most of the plastics are not biodegradable, and their longevity is uncertain in the environment. Most of the polymers will be preserved for centuries (Woo, Ayala& Broadbelt, 2000).On the other side, the degradable plastics may be kept for a significant time, and it depends on different factors like ultraviolet light exposure, oxygen, and temperature, and biodegradable plastics rely on the presence of micro-organism(Achilias, 2007). But the degradation factors vary between landfills, terrestrial and aquatic environments. A plastic item reduces due to the impact of weathering; it breaks down into the minor pieces of plastic wreckage. But polymer cannot degrade in the limit timeframe (Wu, Zhou, Zhao, Deng, Zhang& Wang, 2009; Onwudili, Insura& Williams, 2009). The result of this impact is increasing the accumulation of plastics in landfills and as wreckage in the environment and this factor is giving support to waste-management issues and environmental damage.

Plastic recycling is the only factor to reduce this issue from the environment. Recycling is a waste-management method. It is the process which is used to reprocess the material into useful products. Recycling is part of global efforts to decrease the number of plastics in waste watercourse. Approximately 8 million tons of plastic wastes enter the ocean every year (Ward, Goff, Donner, Kaminsky & O'Connor, 2006; Onwudilia & Williams, 2016). The recycling of plastics is more challenging as compared to the