Chapter 10
Analyses of the Recycling Potential of Medical Plastic Wastes

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ABSTRACT

Medical wastes have been historically disposed of either in landfills or treated in poorly-designed or inadequately-controlled incinerators that leads to the release of a significant quantity of hazardous pollutants, such as dioxins and heavy metals including Cd, Hg and Pb in the environment. This has led to increased public concerns over the disposal of medical wastes. Plastic is one of the most important components of the medical waste. The plastic content (20–25% by weight) of medical waste is significantly higher than that of municipality solid waste. Therefore, recycling of plastics should be increased to save landfill space and also to reduce expensive disposal cost of medical wastes. The recycling issues like risk of transmitting infections, improper collection and separation, can be resolved by proper management, education and innovative waste collection and disposal policies. Analysis and use of alternative products should always be considered as an important part of any recycling program.

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INTRODUCTION

Medical waste management is one of the challenging problems worldwide. Medical waste is classified by the World Health Organization (WHO) as "waste that is generated in the diagnosis, treatment or immunization of human beings or animals." If the medical waste is not properly disposed off it causes various hazardous outputs (Pandey et al., 2016). It affects both biotic and abiotic components of environment (Nie and Wu, 2016). Therefore it is a worldwide concern of disposal of medical waste. The United States tops the list of higher production of medical waste and it alone creates over 3.5 million tonnes of medical waste per year with an average disposal cost of $790 per tonne (Lee et al., 2004). In the developing nations, the medical waste is increasing owing to better medical services. Medical wastes have been historically disposed off either in landfills or treated in poorly designed or inadequately controlled incinerators that leads to release of significant quantity of hazardous pollutants, such as dioxins, furans and heavy metals including Cd, Hg and Pb in the environment. It has led to greater public concerns over the disposal of medical wastes. Plastic is one of the most important components of the waste that occupies landfill space, therefore, recycling of plastics should be increased to save landfill space, to preserve natural resources and to reduce expensive disposal cost of medical wastes (Thompson et al., 2009). The plastic content (20–25% by weight) of medical waste is significantly higher than that of municipality solid waste. The main obstacle in the development of recycling programs for medical wastes is the potential risk of transmitting infections and improper classification of medical wastes (Aljabre, 2002). However, increased cost of medical disposal and limited availability of landfill has lead to efforts that encourage waste recycling.

MEDICAL WASTE

Medical waste is a wider term. It comprises of many different types of wastes including medical waste, regulated medical waste, infectious medical waste and hospital waste. In other words medical waste refers to all waste that is generated at any healthcare or healthcare-related facility (Khajuria et al., 2007). Contaminated syringes and needles represent a particular threat, as the failure to dispose them safely may lead to dangerous recycling and repackaging which lead to unsafe reuse. Contaminated injection equipment may be scavenged from waste areas and dumpsites and either reused or sold to be used again (Gyawali et al., 2013). Biomedical waste may be defined as any waste in the form of solid or liquid, which is generated during the treatment, diagnosis and immunization of human beings and animals in research (Baghotia, 2009). Many synonyms to medical waste exist and they are currently used interchangeably (Mehala et al., 2018). According to Moritz (1995) some of the easily used synonyms are clinical waste, hospital waste and biomedical waste. The WHO uses the term "healthcare waste" in reports and other official publications. The United States Medical Waste Tracking act of 1988 defines medical waste as "any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals". It is estimated by the World Health Organization (WHO) that 20 percent of these medical wastes can be classified as hazardous materials that may be infectious, toxic, or radioactive (Brichard, 2002).