

# Chapter 17

## Bio-waste Management During COVID-19



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**Abstract** Ever since the transmission of novel coronavirus through human-to-human hit the world. As this disease is spreading every day, hospitalisation of individuals increased. Consequence of this, there is a sudden surge of millions of gloves, masks, hand sanitizers and the other essential equipment in each month. Disposal of these commodities is a big challenge for hospitals and COVID-centre, as they may become the reason of creating pollution and infect the surroundings. Increasing hospitalisation cases of COVID-19 results in raising bio-waste which creates pollution. Observing the scenario, a mathematical model with four compartments is constructed in this article. The threshold value indicates the intensity of pollution that emerged from bio-waste. Stability of the equilibrium point gave the necessary condition. Optimal control theory is outlined to achieve the purpose of this chapter by reducing pollution. Outcomes are analytically proven and also numerically simulated.

**Keywords** COVID-19 outbreak · Bio-waste · Hospitalisation · Optimal control · Pollution

**Mathematics Subject Classification** 37NXX · 97NXX

### Introduction

In February 2020, COVID 19 as pandemic globally, the World Health Organization (WHO) stated that this outbreak is highly infectious [1]. Such a contagious and contaminate disease, plastic plays a vital role in making confident social worker to deal with it. As per the latest (2020c) WHO evaluations, the world has consumed

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