Chapter 1
Enzymes Production From Food Waste and Their Application

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ABSTRACT
The chapter reviews the fermentation-based production of industrially important enzymes from food waste (FW). Nearly one-third of the food produced globally is wasted and poses serious problems regarding its disposal. A number of dumping systems have been developed in the nations worldwide which has later become a threat to the environment. This problem is both of an environmental and economic concern. Recent developments in the area have revealed the application of bioremediation as the best way to dispose food waste. Composting and anaerobic digestion of the organic waste are gaining importance for the better use of household-level waste rather than just dumping it in landfill sites. This chapter focuses mainly on the processing waste.

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different types of FW, its disposal techniques, optimization of the fermentation process for the production of different industrially valued enzymes like amylases, cellulases, pectinases, proteases, phytases, and a few others using a wide range of microorganisms from different types of food waste like kitchen waste and food

INTRODUCTION

According to a study by the Food and Agricultural Organisation (FAO), nearly 1.3 billion tons of foods produced globally are lost along the food supply chain. Food waste (FW) can be defined as a biodegradable organic waste discharged from different sources including food processing industries, households and hospitality sectors (FAO, 2012). The rise in population of the world is the main reason behind the increasing amount of FW which poses serious threat to the environment in the form of pollution, health risks and scarcity of dumping land. Among the well-developed nations, the United State, the United Kingdom and Japan are placed on top of the food waste list globally (Melikoglu et al. 2013a). About 96 billion pounds of food was wasted in the US and it amounts to 27% of the total food available for human consumption.

Food waste has been categorized depending on various factors based on the type of food as cereals, fruits, meat, fish, drinks, its nutrient composition as carbohydrates and fat based FW (Russ and Meyer-Pittroff 2004), chemical composition depending on its C, H, N, O, S and Cl content (Bernstad and La Cour Jansen 2012), storage temperature into ambient, chilled or frozen (Bernstad and La Cour Jansen 2012), household level waste as cooked and uncooked, unpackaged and packaged food waste. Food waste was classified into organic comprising fruits and vegetables, catering waste, animal by-products, packaging, mixed food waste and domestic waste by Lin et al. 2013.

In a study that reviewed the characteristics of treated food waste, loss of carbon, nutrients and other compounds during treatment, energy recovery through incineration, hazardous emission from composting, storage and use of bio-fertilizers and chemical fertilizers were found to be a direct cause that leads to global warming and other major environmental and health hazards. One of the main characteristics of food waste, that many other wastes lack is that food waste can be subjected to biological processes like before its disposal. But these processes can result in toxic emission that has negative impact on the environment and will affect its property for the recovery of nutrients and energy recovery by different alternative treatment techniques (Bernstad and La Cour Jansen 2012).
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