

Chapter 29

Various Approaches for Food Waste Processing and Its Management

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ABSTRACT

Food wastage is a huge crisis arising in today's world. An extensive amount of waste generation has become a serious concern of our society in the past years that affects developing and developed countries equally, and according to the Food and Agriculture Organization (FAO), as much as one-third of the food intentionally grown for human consumption is never consumed and is therefore wasted, with significant environmental, social, and economic ramifications. By wasting food, we also waste the time and energy that we have used to produce the food and as well our natural resources and the limited available agricultural land will be used up which could be handled in a much better and sustainable way. Additionally, waste has a strong financial impact and affects the environment including the overall greenhouse gas emission. In an increasingly resource-constrained world, it is imperative to reduce the high environmental, social, and economic impacts associated with this type of waste.

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INTRODUCTION

Every year approximately 1.3 billion tons of food which equals one third of total food production worldwide is lost or wasted (Gustavsson *et al.*, 2011). Food waste is predominantly challenging in industrialized countries that have a major contribution to household food waste. As food production is resource intensive, food losses and wastes indirectly cost the environment and the major effect of this can be seen in the environmental burden in the form of, water and air pollution, deforestation, soil erosion as well as greenhouse gas emissions that occur during the processes of food production, storage, conveyance, and waste-management (Mourad, 2016). Owing to these rising environmental burdens, social and economic concerns towards food waste is progressively accredited as a crucial issue between governments, academics, NGOs, businesses, and the general public (Beretta *et al.*, 2013; Edjabou *et al.*, 2016). Humans are totally depended on plants and animals for their nutritional assistances. The Global Food Report, by the Institute of Mechanical Engineers, has claimed that there could be a whopping three billion to be fed with food by the end of this century. In that period, one can expect great changes in the areas of wealth, calorific intake and dietary preferences of people in developing countries across the globe. Hence, it lies in our hands to focus in producing food in safer quantities by availing the best technologies.

Food waste is generally defined as the loss of materials planned for human ingestion that are afterwards either discharged, which thereby get contaminated, degrade and are subsequently lost. As per the Food and Agriculture Organisation (FAO) of United Nations, food is “Any modification in the accessibility, edibility, wholesomeness or quality of eatable material that averts it from being eaten by people”. This definition was stated for the period of post-harvest of food ending, when the point is of proprietorship of the final consumer (FAO, 1981). Another definition of FL provided by Gustavsson *et al.*, (2011) included description of food supply chain (FSC) production stage along with postharvest and processing stage. According to Parfitt *et al.*, (2010), “Food waste (FW) is the loss of food taking place either at the market stage or at final consumption and utilization stages and is generated due to the negligent behaviour on the part of retailer as well as consumer. European Project FUSIONS defines food waste as “any form of food, edible or inedible, aloof from (diverted or lost from) the food supply chain that is to be either disposed or improved (includes anaerobic digestion, incineration, composted crops, co-generation, bio-energy production, sewer disposal, landfill or discarded into the sea)” (Östergren *et al.*, 2014). For proper metabolic functioning and cellular activities, cell needs energy and this energy comes from food. All human beings depend on food for both energy constraint and survival.

Research study carried by Smil, 2010 explained that when the losses and food wastage along the food supply chain was taken into account along with the transformation of food production into animal feed, it was reported that 43% out of the total food cultivated worldwide is directly consumed by humans. According to the United States Department of Agriculture USDA (2007), in the United States a total of 30% of the food intended for human feeding is wasted every year, mostly in the houses, restaurants and food service establishments. According to Eurostat data (2006) the quantity of food wasted annually in Europe is 89 million tons, equivalent to 180 kg per capita, but this figure is not inclusive of the losses that occur all through the food production and harvesting stages. Looking only at waste in the houses, and using various national data sources, it was found that the amount wasted per person per year is: 110 kg in Great Britain, 109 kg in the United States, 108 kg in Italy, 99 kg in France, 82 kg in Germany and 72 kg in Sweden.

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