

Chapter 28

Utilization and Management of Food Waste

Shriram M. Naikare

SNDT College of Home Science, India

ABSTRACT

The food industry generates a huge amount of waste annually around the globe from a variety of sources. Approximately one third of all food produced today goes to landfill as waste. The food waste is not only a humanitarian problem, but also a serious economic and environmental pollution problem. The global volume of food wastage has been reported to around 1.3bn tones worth to about \$165 bn. In India, about 40% of the food produced is wasted, which is estimated to about Rs. 50,000 crores worth every year. The important types of food wastes generated are agricultural residue, processed food, fruit and vegetable processing, marine food, dairy processing, meat and poultry, hotel and restaurant, etc. The food industrial waste can be converted into byproducts mainly based on the processing of fruits and vegetables and allied food manufacturing, supply and distribution, livestock feed, using it as source of bioactive compounds, useful bioenergy production, artificial fertilizer and decomposed manure, a variety of chemicals, antioxidant, nutraceuticals, etc.

INTRODUCTION

Food supply and waste management are the emerging challenges for the policy makers and companies in the food supply and processing. The global population is expected to grow 9 billion and demand for food upto 77% by 2050. Over the same period, food production will be under threat from climate change, competing land uses, and erosion and diminishing supplies of clean water. The food which we consume has to undergo a series of food processing operations soon after harvesting at the farm level.

The agro-food industry generate huge amount of wastage annually around the globe from a variety of sources. Food is a basic need of human beings, while food waste has been identified a major crucial challenge faced by human community today (Gustavsson et al, 2011).

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Over 4.2 million tons of food waste is dispersed to landfill in Australia each year. 2.7 million tons of this is from households and around 1.5 million tons of this is from commercial and industrial sector, (DEWHA, 2009) costing around \$ 10.5 billion in waste disposal charges and lost product. The largest single contributor in the commercial and industrial sector is food service activities.(Example- Cafes, restaurants, fast food outlets), which generate 661,000 tons of food waste per year, followed by manufacturing (312,000 tones) and food retail (179,000 tons). Most waste in food manufacturing is unavoidable, and almost 90% is already recovered as animal feed, compost or bio-energy. (Verghese et al 2013)

Presently, around 21,000 people die every day due to hunger related causes (Vandermeersch et al, 2014) and globally one in nine people go to bed each night hungry(<http://www.fao>). Nevertheless, approximately one third of all the food produced goes to landfill as waste (Memon,2010). The vast amount of food ending up as waste is not only a humanitarian problem but also serious economic, nutritional and environmental pollution problem (Sakai et al,2011, Autrey et al, 2007).

At global statistics, according to the British Institute of Mechanical Engineers (IME) half of the food produced is wasted worldwide at different stages. The global volume of the food wastage has been reported to around 1.3 billion tons. The total volume of water used each year to produce food that is lost or wasted (250 km³) i.e. equivalent to the annual flow of Russian's Volga river or three times the Lake Geneva. Similarly, 1.4 billion hectares of land 28% of the world's agriculture area is used annually to produce food that is lost or wasted (FAO, 2015). About \$ 165 billion worth of food waste enters landfills each year.

In India, according to UN Development program 40% of the food produced is wasted at pre- and post-harvest stages. Ministry of Food Processing Industries, Government of India's resources about Rs. 58,000 crore worth of food is wasted every year. About 25% of fresh water used to produce food is ultimately wasted as millions of people still don't have access to drinking water. About 300 million of barrels of oil are used to produce food that is ultimately wasted. As a result, a large quantity of food is wasted and being thrown away around the world while a child dies every five seconds because of hunger. In terms of food waste- agricultural produce, meat, poultry and milk- India ranks seventh, with the Russian Federation at the top in the list. India's major land is under agriculture, hence there is highest wastage of cereals, pulses, fruits and vegetables. Meat accounts for just four percent of the food wastage but contributes 20% of the economic cost of the wastage. Wastage of fruits and vegetables is 70% of the total produce, but translated into only 40% of the economic losses. Also, rice crop emits methane, a potent global warming gas, because of the decomposition of organic matter in submerged paddy fields. Food loss and waste costs the world about \$ 940 billion a year.

However, the utilization and disposal of food waste is difficult due to its inadequate biological stability, potentially pathogenic nature, high water content, potential for rapid autoxidation, microbial decomposition through high level of enzymatic activity. The world population will reach to 9.6 billion by 2050 (FAO, 2015).

WORLD ENVIRONMENTAL PROBLEMS

Population growth contributes to GHG (Green House Gas) emission through its effect on deforestation as land is grabbed for enhancing food production (Lambin and Moyfroidt, 2011). As the world's population grows and becomes more affluent, waste production rises and might double by 2025 (Hoornweg et.al, 2013). According to the US Environmental Protection Agency (EPA), food wastage currently represents

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