

# Waste product utilization by using various fruits and vegetables

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## ABSTRACT

Consumers' concerns about nutritious food are increasing, following the similar pattern as government issues about food conservation. Dietary

fibres and prebiotic chemicals found in fruits and vegetables significantly promote people's wellness through processes such as microbiota regulation, postprandial glycemic sensitivity reduction, cholesterol normalization, constipation prevention, phenolic compound transportation, and so on.

**Key Words:** Food and agriculture organization; Waste product utilization; Nutritive value

## INTRODUCTION

According to the Food and Agriculture Organization (FAO) and other sources, roughly 40% of fruits and vegetables are wasted after harvesting and before to retail stages, and approximately 50% after retail, necessitating the development of low-cost and long-term alternatives. Edible and inedible components of fruits and vegetables are eliminated from the food supply chain for various reasons (crops, inadequate deposition, hospitality, domestic, etc.). With better management, a portion of these plant-based wastes can be avoided or reduced. Plant fruits and vegetables that are unwanted are given new homes or discarded [1].

On a worldwide perspective, food waste accounts for one-third to nearly half of the total food consumed (UNFAO, 2016). Nevertheless, based on the stage of food waste formation, the rate of food loss may fluctuate. Food waste is linked not just to economic hardship, but also to the wastage of resources such as land, water, and fertilizers required in its manufacturing. Food waste is disposed of in landfills, where it decomposes, emitting harmful greenhouse gases such as methane. According to reports, such wastes are responsible for 7% of worldwide greenhouse gas emissions [2]. Due to the obvious adverse environmental consequences of their discharge, food manufacturing waste has long been regarded a problem of treatment, minimization, and prevention. Several food wastes are now thought to be a supply of beneficial nutraceuticals. The isolation of nutraceuticals from agricultural by-products is possible thanks to the development of technologies that enable not only their restoration but also their use in food compositions. Due to various detrimental impacts, such as: (1) high phytotoxicity, (2) significant colouring and contamination of natural streams, (3) endangering aquatic life, and (4) difficulties with disagreeable odors, an extremely offensive food waste stream exists [3].

The United Nations' Food and Agriculture Organization (FAO) estimates that one-third of all food supplied for human use is lost or wasted, amounting to over 1.3 billion tons each year. According to one estimate, this lost or discarded fraction could account for up to half of all world food production. The quantity of food that is lost over time is critical considering world population predictions suggest that by 2100, there will be a population of about 12.3 billion people to feed. This implies that an additional 5 billion people will require food. However, current population figures imply that nearly two billion people are undernourished, with roughly 21,000 people dying every day as a result of hunger-related conditions. This corresponds to about 15 people dying every minute, with children accounting for ten of those killed. As a result, there is a strong need for food resources to meet existing needs, and future demographic needs will create an even larger pressure on food supplies [4]. Waste management has become a global headache for authorities. Typically, these wastes have been carried to landfills and burnt, and due to the low cost of dealing with this scenario, this form of disposal and treatment has always been the most convenient for communities. As a consequence, there has been a decrease in land available for sending wastes year after year, as well as an increase in environmental concerns, such as

leaching production and environmental pollution in terms of increasing biogas in the atmosphere and uncontrolled release of methane, all of which are contributing to global climate change. Fruit and vegetable by-products, including roots and tubers, are the most prevalent trash, accounting for 40%-50% of total disregards. Fruit and vegetable by-products, such as seed, pulp, skin, and pomace, are wasted in the form of leftovers, representing for 10%-35% of the raw weight [5].

Food waste is generated in the European Union at a pace of over 89 million tons per year, with this figure predicted to quadruple in the next few years. According to the Food and Agriculture Organization (FAO), over 40% of the food produced in India is wasted. Furthermore, the Food Corporation of India claimed that this loss accounted for 10 to 15% of overall production. The Ministry of Food Processing Industries (MFPI) of India calculated fruit and vegetable wastage at 12 and 21 million tons, respectively, worth around 4.4 billion dollars, with a total food value loss and discarded production worth 10.6 billion dollars. "Fruit and Vegetable Waste" (FVW) is a larger term that pertains to indigestible components that are discarded at various phases such as collection, handling, shipping, and processing. FVW can be defined as fruit and vegetable loss rather than waste, according to the aforementioned definition. FVW can be developed at several points in the food supply chain, from farm to consumer, including both pre- and post-consumer stages [6].

Across the food supply chain, food waste can be avoided or not. Waste that may easily be converted into usable items but is instead wasted in landfills is referred to as unnecessary waste. Unpreventable waste refers to food that humans are unable to consume, such as fruit and vegetable peeling, fish bones, and egg shells. Inescapable trash, on the other hand, can be turned into beneficial materials. As a result, rather than being a reflection of food quality, food waste might be considered as a reflection of human behavior. "The difference between the amount of food generated and the balance of all food utilized in any form of productive usage, whether it is food or nonfood" shall be defined as "food waste". To put it another way, food waste refers to the amount of food that is manufactured and then wasted at any point along the food system. Food waste is referred to by specific terminology depending on where it happens in the food supply chain. Harvest loss refers to food that is thrown away from the farm [7].

Under the demand of a rising population, a rising realization of the inherent limits of natural resources has necessitated a fresh look at human food resource utilization. In nutrition policy and planning, the idea of efficiency ecological and economic has taken on a new importance. At the household level, economic inflation has made optimal use of food resources more visible than it has been in the previous for a greater number of customers. Food bioactive that have beneficial effects on humans in terms of health promotion and diseases reduced risk are gaining popularity among consumers. In addition to generate optimal functional food products, comprehensive knowledge regarding food bioactive is essential [8]. In past years, China's Municipal Solid Waste (MSW) has expanded dramatically.

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As per China Statistics Press's China Statistical Yearbook 2009, the overall proportion of MSW collected and disposed of concentrated in 2008 was around 154 million tons. In China, landfill removal accounts for 90.5 percent of MSW disposal, with incineration and composting accounting for a tiny percentage of MSW disposal. Because of the large percentage of Fruit and Vegetable Waste (FVW) and food waste in some areas, the organic content of MSW exceeds 60%. (FW). The Volatile Solids (VS) concentration of some FVW and FW specimens ranges from 80% to 90%, while the water content ranges from 75% to 95%. Throughout the selection, transportation, and dumping of MSW, the high organic and water composition is the major cause of strong odor's and a lot of leachate. Anaerobic digestion has been proposed as an alternate approach for treating high organic composition trash in order to generate renewable energy-biogas-and to stabilize organic materials [9].

Several evergreen fruit trees thrive in the tropical environment. This climate's constancy enables the production of tropical fruits with few fluctuations that can meet worldwide market requirements. The annual output reflects the worldwide popularity and demand for tropical fruits, as seen in the table. The mango is the most common tropical fruit, with the three primary countries of India, China, and Thailand producing an annual record of 30 million tons. Other popular tropical fruits include pineapple, papaya, and jackfruit. Because to their high nutritional content and medicinal characteristics, passion fruit and mangosteen are becoming more common tropical fruits. Despite of its highly strong peculiar aroma, which is subject to personal acceptability and endurance, the popularity of the durian is limited regionally [10]. Although we can have the waste product from fruits and vegetables as a source of Natural bioactive compounds, proteins, polysaccharides, fares, favor compounds, and phytochemicals, which can be re-used as nutraceuticals and functional ingredients. Food bioactive that have beneficial effects on humans in terms of health promotion and diseases reduced risk are gaining popularity among consumers. In order to obtain optimal functional food products, comprehensive knowledge regarding food bioactive is essential. Therefore, Food waste bioactive can be extracted and used to generate nutraceuticals and functional foods [11]. Furthermore, a whopping 15% (maximum) of total fruit production is squandered. Citrus, banana, and mango peels are the most commonly generated waste materials, owing to the huge production of these fruits in the nation. Food waste has been exploited as a bio resource for our next generation of energy, chemical, pharmaceutical, cosmetic, food, and various high-value-added goods in past years [12].

Food is typically abandoned owing to poor look, damage, or unripen status (if of horticultural origin). Food is cleaned, deshelled, dried, milled, packaged, or combined during processing/manufacturing. Most of the original fruit, vegetable, grain, or animal could be discarded depending on the desired end-product. Also, there could be a loss during the processing/manufacturing stage. Contaminations, faulty manufacturing procedures, and/or malfunctioning equipment during processing have all been blamed. Food is stored and sold in large portions at retail. Short shelf life, low demand, inaccurate labelling, and cold chain issues all contribute to

wholesale losses. Bruises, damaged packaging, and near, present, or past sell-by dates (manufacturer's estimate of food quality) all contribute to loss at retail (selling of small quantities to the general public). There is a distinction between a grocery shop and a supermarket in retail. 'Supermarkets' sell both food and non-food items, while 'grocery stores' sell solely food. However, the line between the two is frequently obscured [13].

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