

# UPCYCLED FOOD: AN INNOVATIVE SOLUTION TO FOOD WASTAGE

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## ABSTRACT

Food waste accounts for roughly one third of the food produced by the global food system. Food waste occurs throughout the food chain, from the farm to the plate. One billion tons of food are thought to be wasted annually. This wasted food is worth more than a trillion dollars. There are numerous reasons why food wastage occurs. This paper will explore the major reasons of food wastage and solution to that problem. An innovative solution that is emerging to address this problem is ‘upcycled food’. Food that would otherwise be thrown away is transformed into new, often healthier products through upcycling. Physical or chemical methods are used to accomplish this. This paper suggests that upcycling is a novel solution with an economic benefit to the global problem of food wastage.

**Keywords:** Food wastage, upcycled food, sustainable development, environment.

## INTRODUCTION

In light of the need to reduce food waste in order to ensure sustainable development, research into the theoretical and practical effects of food waste is becoming increasingly important (Melikoglu et al., 2013; Bhatt et al., 2018). To achieve the Sustainable Development Goal (SDG), it is necessary to make changes to the current practices of food waste (Bengtsson, 2018). By 2030, the reduction of food waste at the retail and consumer levels as well as along production and supply chains is also the goal of Sustainable Development Goal 12.3.

(Transforming our world: the 2030 Agenda for Sustainable Development, 2016). However, current food waste practices threaten the long-term viability of food systems (Bengtsson, 2018).

Food waste accounts for about 30% of global food production, according to the Food and Agricultural Organization (FAO) of the United Nations (Gustavsson, 2011). In 2019, more than 930 million tons of food sold were thrown away, according to the Food Index Report (2021). Melikoglu et al. (2013) stated that, the amount of wasted food globally is sufficient to feed the entire world's hungry population. In addition, according to FAO (2019), in developing nations, food waste is estimated to cost \$310 billion, while in industrialized nations, it is estimated to cost \$680 billion. With the intention of turning the problem of food waste into an opportunity for businesses, innovative solutions must be found (McCarthy et al., 2019).

## **FOOD WASTAGE IN INDIA**

Food wastage has become a pressing issue in India. Every year, millions of tons of food goes to waste (FAO, 2019). In India, 40% of the food produced, ends up in the bin, which is equivalent to ₹ 92 thousand crores in a year. As the food is a limited resource therefore the food waste is a problem (Melikoglu et al., 2013). When food is wasted, it means that people are going hungry. Despite the high production of food, India is still at 107<sup>th</sup> rank out of 121 nations on the 2022 Global Hunger Index (GHI, 2022). As indicated by a 2019 report by the UN Food and Agriculture Organization, around 190 million Indians were undernourished. Moreover, it indicated that every third undernourished kid in world is Indian. For meeting the food needs of the constantly growing population in India (1.7 billion by 2050), the problem of food waste poses a serious challenge (GHI, 2022). The goal of this paper is to find a solution to food waste. It is necessary to first understand the reasons for this waste before finding a solution.

## **REASONS OF FOOD WASTAGE**

There are many factors that can lead to food waste, including problems with production, inefficiencies in the supply chain, and consumer behavior (Bhatt et al., 2018). However, food retailers' inability to sell imperfect produce accounts for a significant portion of this food waste. Farmers dispose of "abnormal," "ugly," or "substandard" fruits and vegetables due to retailers' cosmetic requirements for agricultural produce (UFA, 2019). Damage during transportation, storage, and processing also results in food waste (Thyberg, 2016). Additionally, one factor contributing to food waste in food service establishments is an overstocked buffet (Gao et al., 2021). Food waste emerges from confusion about legal regulations regarding food shelf life, such as food expiry labels (Bhatt et al., 2018). The amount of food that is thrown away has a significant impact not only on people's wallets but also on the environment (Melikoglu et al., 2013). Food production necessitates a significant amount of energy, water, and land (Thyberg, 2016). Additionally, the production of greenhouse gases has negative effects on the natural environment (FAO, 2019).

## **HARMFUL EFFECTS OF FOOD WASTAGE**

Methane, a greenhouse gas that is 84 times more potent than carbon dioxide over a 20-year period, is released when 95 percent of food that is wasted ends up in landfills, according to the USDA. According to UNEP (2021), about 8% of greenhouse gas (GHG) emissions are caused by food waste (GHGs). Following China and the United States of America, food waste would be third largest emitter of greenhouse gases in the world. There is an increase in emissions of greenhouse gases as a result of the creation and breaking-down of food that is wasted (Laureti & Benedetti, 2018), which impacts climate change negatively (Melikoglu et al., 2013). Multiple changes in the food industry are especially important for overcoming these negative effects (Aschemann-Witzel & Peschel, 2019; Laureti & Benedetti, 2018). As per a new report of 2019 by the EAT-Lancet commission, decrease in food waste is an urgent element of the sustainable food system (FAO, 2019).

## **UPCYCLED FOOD – A POTENTIAL SOLUTION TO DECREASE FOOD WASTE**

Food that is upcycled is relatively a new category of food (Spratt et al., 2020) and represents a potential solution for reducing food waste. This strategy involves turning high-value by-products like fruit and vegetable residues, which are safe and healthy for consumption, back into production streams (Lin et al., 2013). Upcycled food products are made from the rejected materials (Peschel & Aschemann-Witzel, 2020). Upcycling increases a product's nutritional value (Braungrat et al., 2007). Food products and ingredients that have been upcycled increase the use of food that would otherwise be wasted and have tangible benefits for society and the environment, according to Spratt et al. (2021)'s definition of upcycled food. Ingredients used in the upcycled foods come from sources that would not have been available to human consumption, they are obtained and produced through traceable supply chains, and they are good for the environment, states the Upcycled Food Association (2021).

Numerous established and emerging food companies recognize the production of upcycled food as a novel strategy (O'Donnell et al., 2015). An upcycled food product's primary objective is to upcycle the novel food category's formally wasted food (McCarthy et al., 2019). Upcycled food is therefore regarded as an environmentally friendly product. These food items bring about decreased food wastage inside the production processes (Bhatt et al., 2018). Consumers rated upcycled products higher than conventional food because of the social benefits of this novel food (Spratt et al., 2021). There are numerous advantages to upcycling food, including the ability to increase supply chain value capture (McCarthy et al., 2019) while increasing earnings and decreasing dumping expenses (McCarthy et al., 2020), as well as increasing efforts to conserve scarce resources like energy, labor, land, water and agrochemicals (UFA, 2019). Renewal Mill in San Francisco, California, is an illustration of an upcycled food business. According to Simcik (2019), Renewal Mill uses the soybean pulp that is produced as a byproduct of the production of soymilk to make flour known as okara. Despite the fact that it is safe to eat and packed with nutrients like protein and fiber, the pulp is frequently discarded.

Utilizing these and comparative fixings to make esteem added food varieties is a feasible answer for diminishing food waste (Zhang et al., 2020; Aschemann-Witzel and Peschel, 2019). The production of upcycled food by food processing companies reflects the increasing awareness of the environmental and economic benefits of this practice (Asioli & Grasso, 2021). Companies are concerned not only about the impact on the environment but also about the impact on the company's future profitability, which is why there has been a shift and growing interest in the production of upcycled food products (McCarthy et al., 2020).

## **UPCYCLED FOOD PRACTICES IN INDIA**

Upcycled food products are being produced by global food brands like ReGrained, Planetarians, FoPo Food Powder, Candid, Wize, and Sweet Benin (UFA, 2021). In India, upcycled food is also getting more and more popular. For instance, Kocoatrait is a chocolate company based in Chennai that makes chocolate bars in a variety of flavors out of upcycled cocoa husk paper and other ingredients. Zero waste is the primary goal of this organization (Kocoatrait, 2021). The repurposed foods are also available in commercial kitchens.

Restaurants have also followed the upcycling trend. Upcycled ingredients are being used in some restaurants (Singh, 2021). Numerous Indian restaurants, including SAGA in Gurgaon, Anardana Modern Kitchen and Bar in Delhi, Plural in Mumbai, and Taj Lands End in Mumbai, are following the upcycling trend and offering upcycled food alongside traditional menu items, as reported in The Economic Times Hospitality World 2021. These eateries thrive on making use of every part of raw produce, including fish skin for chips and dehydrated vegetable peels for garnish, among other things (Singh, 2021). These restaurants and brands have demonstrated that it is possible to reduce waste while maintaining taste and quality. According to recent research (McCarthy et al., 2019; Coderoni & Perito et al., 2020; Bhatt et al., 2020; Asioli & Grasso, 2021; Zhang et al., 2020), consumers' willingness to purchase upcycled food products indicates a market opportunity.

## **CONCLUSION**

Food made from leftovers and scraps is not a new idea; people have been doing so for centuries (Aschemann-Witzel & Peschel, 2019). Upcycling is the transformation of something that would ordinarily be regarded as waste into something valuable (UFA, 2021). This idea can be applied to food in a number of different ways, like making stock from vegetable scraps, bread pudding from stale bread, and jam from overripe fruit (Simcik, 2019). In addition to reducing waste, upcycling food has the potential to produce novel and intriguing dishes. Food waste that would otherwise end up in a landfill is used to make upcycled food. Food waste can be reduced in a sustainable and friendly manner, and healthy and affordable food options can be provided. Food that has been upcycled can be used in a variety of dishes, including casseroles, stews, soups, and even desserts. This paper suggests that 'upcycling of food' is an emerging solution to the problem of food wastage. The Indian organizations are also following this trend to prevent the

food wastage at source. However, the empirical investigation of the upcycled food adoption is not being examined in this paper. The future study should examine the various factors that would affect the adoption of this food.

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