

**Consumer Willingness-to-Pay for Blemished Fresh Produce and Its Implications for Food Waste**

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## Introduction

Food waste, a part of food loss, has become an increasingly discussed topic over the past couple of decades. Some food is lost throughout the supply chain because of almost inevitable issues, such as food spoilage during transportation, product shrinkage after harvesting, or poor packaging (Gunders, 2012). Food waste, however, refers to “food which is fit for consumption, but is still discarded, usually at retail and consumer levels”<sup>1</sup>. At the consumer level, developed countries waste approximately 222 million tons of food per year (Gustavsson et al., 2011). Not surprisingly, these amounts of food waste have large economic, social, and environmental costs. After recycling, composting, and energy recovery, food comprised 21.1% of all municipal solid waste that was landfilled in 2014 in the United States, the largest contribution to total landfilled municipal solid waste (US EPA, November 2016). In Europe, the British Waste and Resources Action Program found that, from avoidable household food waste, citizens of the United Kingdom produced approximately 730 pounds equivalent of carbon dioxide per person per year, or one-third of carbon dioxide emissions associated with household electricity per person (Secondi et al., 2015).

The literature shows that “consumers tend to expect high levels of perfection in appearance and freshness in modern supermarkets;” therefore, experts agree that one of the main causes of food waste is consumers’ desires to have aesthetically pleasing fresh produce (Aschemann-Witzel et al., p. 6466, 2015). The literature also shows that consumer education could be beneficial in reducing the amounts of food waste at the consumer level (Aschemann-Witzel et al., 2015; Whitehair et al., 2013). Moreover, other studies (Neff, et al., 2015) and governmental programs, such as “Food: Too Good to Waste”, (US EPA, April 2016), show that there is a need to educate consumers about the environmental consequences of food waste. In this study, we use data collected from a non- hypothetical second price auction to examine whether and how information on fresh produce aesthetic preferences, grocery store standards, and food waste affects consumer preferences for blemished fresh produce. We also examine how information about the environmental impacts of food waste affects consumer purchasing behavior.

## Data and Methods

We conducted a non- hypothetical Vickrey 2<sup>nd</sup> price auction for blemished sweet potatoes to determine if and how various information treatments designed to mitigate food waste affect consumer preferences for blemished fresh produce. Throughout the course of two days, we conducted ten one-hour long experimental auction sessions. Each session included between 6 and 18 participants, with a total of 88 participants, and was allocated to one of three different treatments. Participants in treatment one received information about the relationship between consumer aesthetic perceptions of fresh produce, grocery store standards, and food waste. Those in treatment two received the same information plus additional information about the environmental impacts of food waste, while those in treatment three received the same information as those in treatment 1 and read a consequentiality letter at the beginning of the session. In total, three sessions were allocated to treatment one, three sessions to treatment two, and four sessions to treatment three.

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<sup>1</sup> <http://www.fao.org/food-loss-and-food-waste/en/>

During any given session, participants bid on fresh sweet potatoes with various levels of blemishing during three consecutive rounds. The sweet potatoes were sorted into five categories given their blemishing levels: 0-<1%, 1-3%, 3.1-5%, 5.1-7.5%, and 7.6-10%. The first round of bidding was blind, meaning that the participants did not know the percentage of blemishing prior to bidding. The second and third rounds, however, were labeled, meaning that the participants knew the percentage of blemishing prior to bidding. Before the third round of bidding took place, we implemented our information treatments. After all rounds of bidding, we collected additional demographic and behavioral information through a survey and then chose the purchaser for each session by randomly selecting one of the three rounds as binding.

## **Preliminary Results**

We use a random effects linear model to examine the results. We find that consumers have a significant increase in willingness to pay on a per-pound basis for sweet potatoes with higher blemishing levels after learning about the relationship between blemished produce and food waste. After learning about this relationship, consumers placed a premium that ranged from \$0.19 per pound (1-3% blemishing level) to \$0.32 per pound (5.1-10% blemishing level) for blemished produce. Adding the information about the environmental impacts of food waste had a significant effect on willingness to pay for sweet potatoes with blemishing levels of 0% to <1% and of 1-3% by creating a statistically significant \$0.25 per pound premium for both blemishing level groups. Blemishing level groups from 3.1-7.5% still had a significant increase in willingness to pay but the increase was the same as the food waste information only group. For the blemishing level above 7.6% to 10%, consumers placed a lower premium on sweet potatoes, at \$0.29 per pound, than when just receiving information about food waste.

## **Conclusions**

Overall, we find that educating consumers about food waste and its environmental impacts has a positive effect on willingness to pay for all levels of blemishing for fresh sweet potatoes. Our study shows that consumers do respond to being educated about the relationship between blemished produce, food waste, and the environmental impacts of food waste. This information could be beneficial for both governmental and private agencies as they further research methods and opportunities to mitigate food waste. Our findings may also provide insights into the marketing of blemished fresh produce and help producers, retailers, and agribusiness entrepreneurs raise revenue and reduce waste.

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