

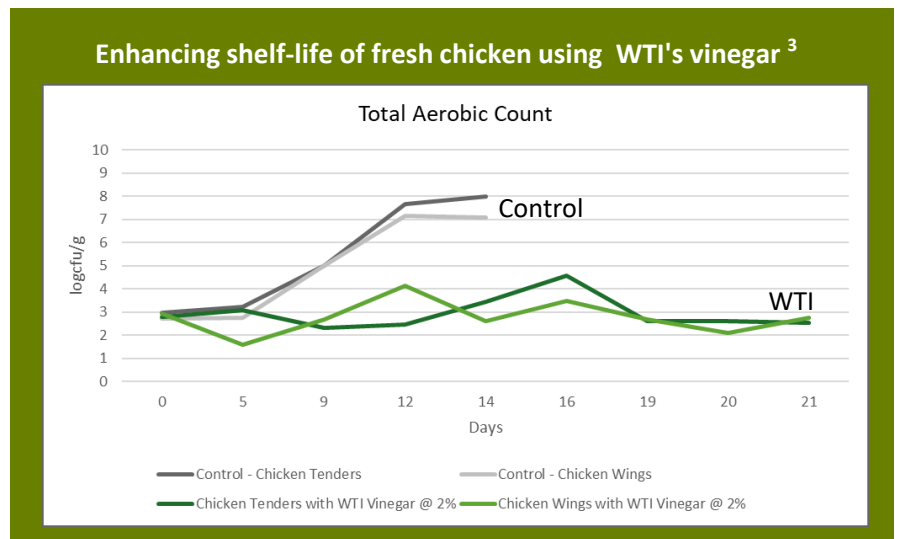


Food waste can be reduced by extending shelf-life and improving safety using various interventions during the food preparation processes, including World Technology Ingredients, Inc.'s (WTI) naturally-derived functional food ingredients. WTI's vinegar and lemon juice-based ingredients preserve food, prolong shelf-life, enhance safety, and protect consumers from foodborne illnesses. By incorporating WTI's ingredients, food manufacturers, restaurants and food service companies have more satisfied customers, mitigate supply chain risk and reduce food waste, all in a truly sustainable way.

Food waste refers to food appropriate for human consumption that is being discarded. The statistics today on food waste are very concerning. Globally, approximately 2.8 trillion pounds of food are wasted every year with 80 billion in the U.S. alone, more than any country in the world, which equates to between 30% to 40% of the U.S. food supply. On average, Americans waste one pound of food, per person, per day.¹

About 50% of consumer food waste can be prevented by extending the shelf-life of food.²

Extend shelf-life. Chicken tenders and chicken wings containing WTI's vinegar antimicrobial achieved an additional seven days of shelf-life over those without. Further, the flavors and textures of the chicken were more consistent across the entire shelf-life and chicken consumed near the "use by date" tasted the same as when first manufactured.



Think of the impact one additional week of shelf-life would have on reducing food waste!

Food Waste

Food is wasted for various reasons including: spoilage; misinterpretation of labels; over purchases and underutilization in homes, restaurants, grocery stores and food service companies; impulsive purchases; and, lack of composting.

Some of the food waste is with good foundation due to food spoilage, while most of it due to the misinterpretation on labels, such as “sell by”, “use by”, etc. More than 80% of Americans discard perfectly good, consumable food due to misunderstanding labels.¹

Americans often over purchase food as it is more plentiful and less costly than in other countries and make more impulsive food purchases. Food not fully consumed from home-made dinners, takeout/delivery or in a restaurant is often stored to be consumed later.

However, using leftovers in a timely manner requires intentional thought and they are often underutilized and are wasted.

A U.S. restaurant may end up throwing out 4% to 10% of the food it purchases, and that percentage can rise in buffet-style concepts and at restaurants with diverse menu offerings. A portion of the restaurant food waste is pre-consumer food waste – over ordering, overproduction, trim waste, expiration, spoilage, overcooking, contaminating or dropping items.⁴

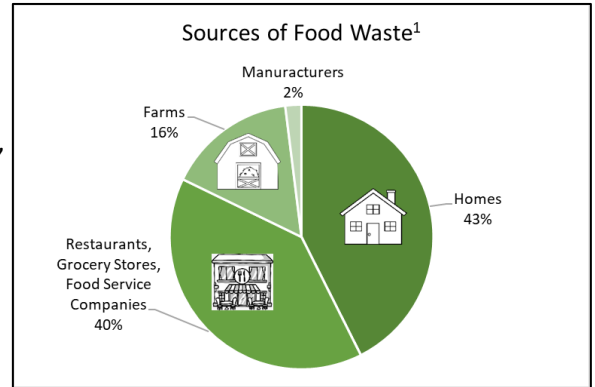
About 30% of food in grocery stores is thrown away. This wasted food is valued at about twice the amount of profit from food sales.¹

Americans do not routinely compost food scraps for a variety of reasons and thus most food wasted goes into landfills and constitutes 22% of Municipal Solid Waste.¹

Food Waste Implications

Food waste is far more reaching than merely purchasing something which is ultimately discarded. In addition to the calculatable financial loss of a transaction, it has a more pronounced societal implication. The utilization of valuable resources, such as water, fertilizer and seed, required to grow feed and food are not in unlimited supply, nor are the fossil fuels used for farming, transport and labor. To think that 30% to 40% of these efforts and expenses end up in a landfill when we have citizens hungry in the U.S. and abroad, requires serious consideration and adoption of ways to deal with, reduce and end.

Wasting food has environmental repercussions. It is a waste of the water, energy and labor to produce it and generates greenhouse gases (GHG) in the form of methane, carbon dioxide and chlorofluorocarbons which may contribute to climate change. The total GHG produced are similar to the emissions of 37 million autos according to the World Wildlife Federation.¹



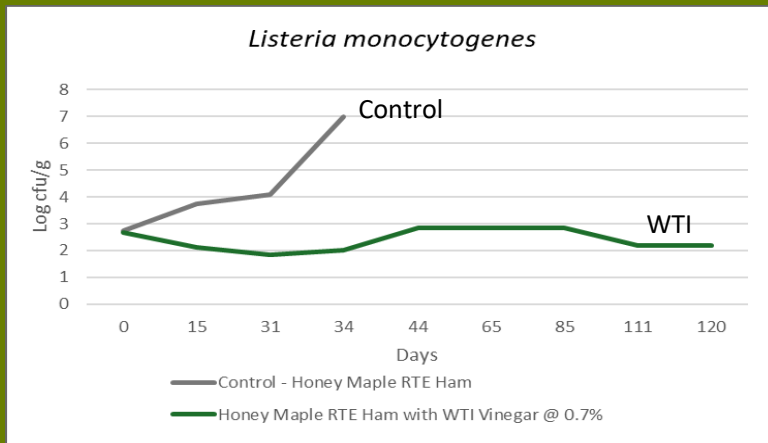
A family of four tosses out about \$1,600 per year in produce.¹

Food Safety

WTI, a leader in the functional food ingredient industry for over three decades, has been focused on designing ways to prolong shelf-life and inhibit pathogenic bacteria, naturally. This in turn helps to reduce food waste due to spoilage or any safety concerns. WTI technology uses two base ingredients, vinegar and lemon juice concentrate that are naturally-derived from plant-based sources. The ingredients are clean, natural and sourced renewably.

WTI's core focus is enhancing the freshness and reducing the likelihood for foodborne illness to result from consuming foods. This has always been important, yet in recent times, it certainly reinforces the need to protect consumers from themselves, reduce the amount of spoilage and truly provide an additional layer of meaningful protection for unwanted consequence.

Extending shelf-life and safety of Honey Maple RTE Ham using WTI's vinegar ⁵



Inhibit the growth of pathogens.

WTI's vinegar antimicrobial controlled the outgrowth of *Listeria monocytogenes* in ready-to-eat honey maple ham for over 120 days, extending the safety well beyond the ham without WTI ingredients. The flavor and texture of the ham was consistent throughout the shelf-life. WTI ingredients keep food safe to eat longer, reducing food waste.

The Complexity of the Food Supply Chain

Conditions over food product life cycle are not always ideal. Microbial spoilage is inherent to certain products due to their very nature. Focus on sanitation and hygiene during processing is of utmost importance. Several mitigation strategies have been employed which create hurdles at different processing intervals to minimize, reduce and in some cases, are lethal to certain microbes. Additionally, an extra layer of protection is required which WTI ingredients provide. WTI's ingredients elevate food safety and preservation, while simultaneously enhancing quality across a variety of food items, including meat, poultry, prepared foods, soups, sauces, dressings, dairy and bakery.

The Food Supply Chain



Farms: Food is typically grown in a non-sterile environment and thus the product (including animal, avian and aquatic) harbors certain microbes on or within their system upon harvest, and ultimately their conversion to a food stuff.

Manufacturer: Challenges with initial microbial load, temperature (cold chain) and time from harvest, handling and re-packaging and storage are aspects for which there is incomplete control. While we know a great deal about the optimum handling and can create and implement predictive models to typify the norms, when situations evolve because of disruptions to one or more of the factors above, microbial growth can occur rapidly reducing storage length from the norm and potentially enable the growth of undesirable pathogenic organisms that can cause a foodborne illness.

Restaurants, Food Service and Grocery Stores: Adding to the challenges listed above, which are relatively well known and can be fairly reliably accounted for with Good Manufacturing Practices, complexity exists. The recent COVID global pandemic has created challenges never imagined, including, labor shortages, supply chain disruption, distribution and transportation challenges, and a shift from food service where most Americans ate more meals away from home than at home. The demand at food service and many of the broad menus required a large number and variety of ingredients. With demand uncertainty, food was stored longer.

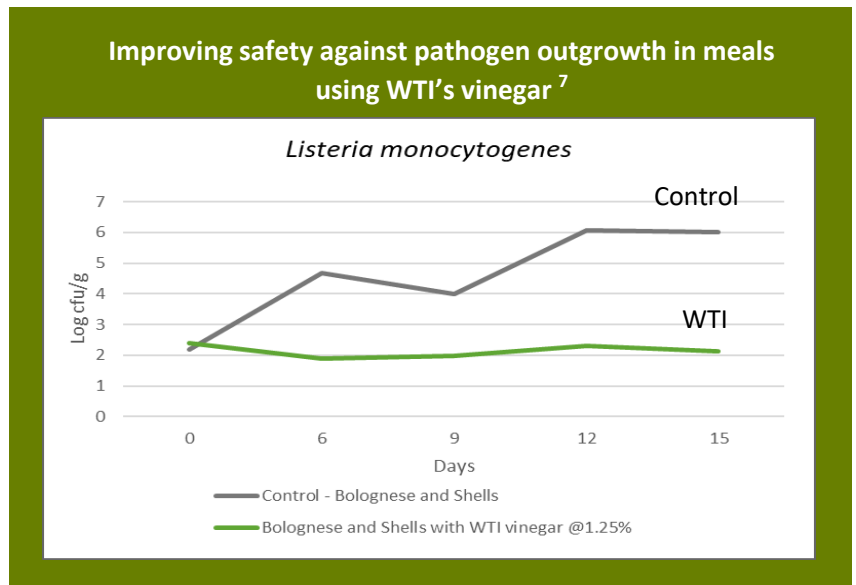
Home: Americans prepare between 4-5 dinners at home during a typical week, which is a return to the 2018 levels.⁶ Because of inflation, consumers are buying certain products in bulk or purchasing more quantities when items are featured or on a coupon deal. During the pandemic, consumers tended to buy larger quantities and portions due to several food shortages and stored these for extended periods in their refrigerators and freezers. Consumer knowledge on cross contamination between raw and cooked food, re-packaging food and storing food in the refrigerator safely is somewhat limited increasing the chances of food spoilage, which may lead to a foodborne illness if consumed absent appropriate heating.

Extra Layer of Protection

WTI's vinegar antimicrobials improve safety and preservation along the food supply chain to protect consumers from foodborne illnesses even when conditions are not ideal.

Additional Protection.

WTI's vinegar antimicrobial controlled the outgrowth of *Listeria monocytogenes* in Bolognese and shells for over 15 days. WTI protected the meal and extended the shelf-life longer than the meal without WTI ingredients.



Conclusion

Food waste has ramifications that influence quality of life and the health of the planet. In our way, we are responding to this challenge and have been for three generations.

Utilizing WTI products will extend freshness and promote consumer safety in a variety of food products.

Please reach out to our team and let's discuss how we can together make meaningful improvements that reduce food waste, optimize safety, nutritional value, spend and efficiencies.



www.wtiinc.com

Contact our Customer Care team:
800.827.1727
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