Keeping Bagged Salads Safe

Researchers are focusing on ways to keep leafy greens safe at processing facilities and at home. Their studies range from washing products before bagging to effective storage conditions afterward. Washing and sanitizing are important steps used to reduce contamination on product surfaces to increase the safety and quality of precut produce before it is placed in bags.

One researcher simulated washing techniques to learn more about how practices in the industry affect safety and quality of precut lettuce. For the study, Romaine lettuce leaves were sliced and then rinsed in either fresh wash water or in reused wash water. The washed leaves were then dried, placed into bags made from special oxygen-permeable films, and stored at 4°F.

Microbial growth and product quality were monitored at 0, 4, 8, 11, and 14 days of storage. At the end of the storage time, unwashed control leaves and leaves washed with water that had been reused many times had higher bacterial populations than leaves washed with clean water. Washing a small amount of lettuce thoroughly in a large amount of clean water resulted in the least off-odor.

When water was reused during the washing process, organic matter rapidly accumulated within the wash water and compromised the efficiency of any sanitizers that had been applied. This new information gives produce packers new tools in designing wash systems and managing wash operations for enhancing food safety and quality.

(Source: Agricultural Research, July 2008.)

Questionable Food Safety

In 1906, Upton Sinclair's novel, The Jungle, exposed the corruption that was taking place inside meat-packing factories. The author sent President Theodore Roosevelt a copy of the book. After much persuasion from the author as to the seriousness of the situation, the President agreed to send two men to investigate Sinclair's claims.

That same year, President Roosevelt signed into law the Food and Drug Act, which established the Food and Drug Administration (FDA). The Act prohibited interstate transport of food which had been "adulterated" or that contained "filthy, decomposed, or putrid" substances. Today, the FDA is responsible for examining food and drugs for such "adulteration" or "misbranding."

Contaminated bacteria are still rampant in meat-packing plants and in produce fields, but the government's oversight has steadily been eroding. Recent outbreaks of food-borne illness in humans and pets have raised serious questions about the FDA's ability to protect the public against contaminated or adulterated foods.

Meanwhile, the number of food imports has been skyrocketing. FDA personnel allegedly inspect less than 1 percent of all imported foods, and they conduct laboratory analyses on only a tiny fraction of those. Overwhelmed personnel typically have less than 30 seconds to decide whether an import needs closer scrutiny. Consequently, food safety has been notably questionable in the midst of such an anti-regulatory climate.

These outbreaks have shown that more needs to be done to enhance prevention of problems at the source. To reduce the risk of food-borne illness at all points in the food chain, the FDA has adopted a "farm-to-fork" approach to food safety.

(Source: FDA News, July 17, 2007.)

Anise—for Licorice, and Beyond

Anise, often used to add a hint of licorice, also has a considerable reputation as a medication for coughs and upper respiratory infections. Researchers from the Agricultural Research Service have discovered that anise (Pimpinella) is more than just another spice in the spice rack. They isolated 22 compounds in Pimpinella's essential oils and noted the presence of high levels of phenylpropanoids. These substances occur in a wide variety of plants and are thought to have health-boosting benefits. However, their chemical structure and biological activity in Pimpinella are unique.

The compounds were evaluated for their activity against the plant fungus Colletotrichum, which causes anthrax-type diseases worldwide. One unique compound was especially effective against strawberry anthracnose and strawberry soft rot and leaf blight. Pimpinella isaurica essential oils were also more effective in controlling aphids than isolated Pimpinella phenylpropanoids. These compounds were also tested for their activity against various microbes. A few showed some effectiveness against Plasmodium falciparum, the parasite that causes malaria in humans, and Mycobacterium intracellulare, a bacterium which can cause illness in patients with compromised immune systems.

Some phenylpropanoids exhibited anti-inflammatory activities. Pimpinella essential oils also showed estrogenic effects in a yeast model and were considered to have phytoestrogen properties. These results suggest that Pimpinella essential oils may be a source of potent compounds that could be used in developing powerful pharmaceuticals and agrochemical agents.


Plant Extracts Conquer Microbes

Tender leaves of deep-green, freshly harvested spinach—neatly displayed in sealed bags at the chilled-produce section of your local supermarket—may one day include a powerful new food safety feature. That added protection might take shape as a tiny piece of "edible film," made from a puree of spinach itself.

When slipped into the bag, the protective power of this pureed spinach wedge would come from a potent antimicrobial compound chosen from nature's bounty of botanical bactericides. The agent would be added in very small amounts during the pureeing process to provide a safe, natural defense against pathogens like Escherichia coli O157:H7, Salmonella, Listeria, and others.

For example, carvacrol, the predominant essential oil in orégano, would add a pleasant and protective accent to a spinach puree film. Already shown in laboratory studies to be effective against several major food-borne pathogens, carvacrol is used to add flavor to some salad dressings and seasoning mixes.

Does all this seem too good to be true? Not so, say scientists. The films being developed would supplement other food safety strategies and tactics on the farm, at the packinghouse, and elsewhere along the journey from field to fork. In pioneering experiments, researchers are selecting plant extracts, such as carvacrol, to place in the experimental films, then pitting the films against pathogenic bacteria such as E. coli.

Though more study is needed to iron out any remaining wrinkles, these findings from films made with purees of Golden Delicious or Fuji apples provide proof that the concept is sound, that the botanical extracts are powerful, and that practical, affordable films are within technology's reach.

(Source: Agricultural Research, July 2008.)

"What did I say about finishing your vegetables, Billy?"