

Food Safety and Its Concerns in the Production of Specialty Foods

Specialty Food Safety Workshop
March 5, 2010



Taste and quality are important to specialty food. More important is making sure that customers always get a safe and wholesome food product.



Annual Burden of Foodborne Illness in the United States

- 76 million illnesses
- 325,000 hospitalizations
- 5,000 deaths
- ≥ \$6.5 billion in medical and other costs

• Estimated by Centers for Disease Control and Prevention
<http://www.cdc.gov/>



Some Foodborne Outbreaks in 2009

- 225 people infected with *Salmonella* Montevideo in 44 states by eating Italian-style sausage products including salami.
- 714 persons from 46 states infected with *Salmonella* Typhimurium through the consumption of peanut butter and prepackaged peanut butter crackers.
- 70 persons infected with *E. coli* O157:H7 in 30 states in May and June, linked to eating raw refrigerated, prepackaged cookie dough.



Source: Morbidity and Mortality Weekly Report (MMWR)

The Cost of Foodborne Illness

- Loss of business and reputation
- Lawsuits, attorney and court fees
- Increased insurance premiums
- Loss of employee morale
- Embarrassment
- Financial disaster!



Food Safety Hazards: Three Types of Contamination



Physical



Chemical



Biological

Physical Food Safety Hazards

- Wood
- Plastic
- Metal
- Glass
- Hay, grass
- Insects
- Tools
- Gloves, bandages, pens and other personal items



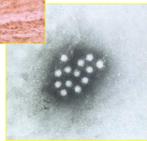
Chemical Food Safety Hazards

- Cleaning chemicals, sanitizers
- Lubricants, other plant chemicals
- Pesticides
- Heavy metals, such as lead
- Allergens – the big eight
- Toxins, such as patulin (a mycotoxin produced by a variety of molds)



Biological Food Safety Hazards

- Parasites
- Viruses
- Bacteria



Parasites

- *Cyclospora cayentanensis*: a protozoan that causes a self-limiting diarrhea through the oral-fecal route.
- *Cryptosporidium parvum*: primary symptoms are acute, watery, and non-bloody diarrhea; of particular concern in immunocompromised patients, leading to dehydration and, in severe cases, death.
- *Giardia lamblia*: a flagellated protozoan that causes diarrhea, malaise, excessive gas et al., through ingestion of dormant cysts in contaminated water, food, or by the fecal-oral route.



Viruses

- **Hepatitis A virus**: causes an acute infectious disease of the liver through the oral-fecal route via contaminated food or drinking water; approximately 10 million people worldwide are infected with this virus every year.
- **Norovirus**: cause acute gastroenteritis in humans; increasingly being recognized as leading causes of foodborne disease in the U.S.
- **Rotavirus**: the leading single cause of severe diarrhea among infants and young children; transmitted by the oral-fecal route.

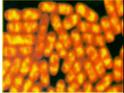


Sources of Biological Contamination

- Animals (manure and manure, animal living spaces, carcasses)
- People (food handlers, pickers, packers, and consumers)
- Environment (contaminated water, air, plants)



Bacteria from Animals



- *Salmonella* spp.
 - Cause diarrheal illness in humans
 - Pass from the feces of people or animals to other people
 - Associated foods: raw and undercooked eggs, undercooked poultry, fruits and vegetables
 - Serotype Typhimurium & Enteritidis are most common in the U.S.
- *E. coli* O157:H7
 - Can produce deadly toxins, leading to hemorrhagic diarrhea, and occasionally to kidney failure
 - Associated foods: raw and undercooked ground beef, unpasteurized milk and juice, contaminated water, fruits and vegetables



Bacteria from People

- *Shigella* spp.
 - Only naturally found in humans
 - Causes dysentery via ingestion (fecal–oral contamination)
 - Some strains produce enterotoxin and Shiga toxin, causing hemolytic uremic syndrome
 - Associated foods: salads, raw vegetables, milk and dairy products, meat



Bacteria from the Environment



- *Listeria monocytogenes*
 - Widely distributed in nature
 - One of the most virulent foodborne pathogens; responsible for ~2,500 illnesses and 500 deaths in the U.S. annually
 - Its ability to grow at temperatures as low as 3°C permits multiplication in refrigerated foods - the USDA retains a zero tolerance policy for ready-to-eat foods
 - Associated foods: raw and unpasteurized milk and cheeses, ice cream, raw vegetables, raw and undercooked meat and poultry, raw and smoked fish

Any Food Safety Concern in the Production of Specialty Food Products?

Recent Recalls Associated with Specialty Food Products

Whole Foods Market Recent Recalls
<http://www.wholefoodsmarket.com/nutrition/product-recalls.php>

- On December 17, 2009, Faribault Foods voluntarily recalled 3 lots of Health Valley Organic No Salt Added Split Pea Soup due to the presence of an undeclared dairy allergen. 
- On November 2, 2009, Alexia Foods issued nationwide allergy alert and product recall on its Alexia Olive Oil, Sun-Dried Tomatoes & Pesto Oven Reds frozen potatoes due to undeclared pine nut allergen. 
- On October 23, 2009, Unilever issued allergy alert in a limited number of tubs of Breyers ice cream because it was mispackaged and may contain undeclared wheat. 
- On September 9, 2009, Premier Organics issued nationwide recall for Artisana Raw Tahini because of the possible presence of *Salmonella*. 
- On April 21, 2009, Whole Foods Market is voluntarily recalling bulk and pre-packaged items because they may contain pistachios that have the potential to be contaminated with *salmonella*. 

Trade Joe’s Recent Recall

- Trader Joe’s Co., Monrovia, Calif., is voluntarily recalling Trader Joe’s Chocolate Chip Chewy Coated Granola Bars, manufactured by Bloomfield Bakery, a subsidiary of Ralcorp Holdings Inc., because it has the potential to be contaminated with *Salmonella*.



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Food Safety in Specialty Foods Production

- Many specialty foods are claimed to be "all natural", with no preservatives used.
 - ✓ Great appeal to consumers
 - ✓ May lack the barriers to prevent microbial contamination, especially from foodborne pathogens



Food Safety in Specialty Foods Production

- Uncommon and/or poorly characterized ingredients and processing procedures may be used in certain specialty foods, which may lead to potential food allergy and microbial safety problems.



Food Safety in Specialty Foods Production

- No specific standards and/or regulations have been developed for specialty food processing.
- Many specialty food products are sold in farmers' markets and local specialty food stores, which may lack regulatory oversight.
- Compounding this problem is that food regulatory field staff may lack specific knowledge of specialty food products, and thus being unable to assess their safety.

Food Safety in Specialty Foods Production

- Some specialty foods are manufactured in small scale operations and some processors are newly started family businesses.
 - ✓ May have limited training and experience in safe food production practices.
 - ✓ May be unaware of licensing and inspection requirements, and therefore, the products may present a potential threat to public health



Key Food Safety Principles

– **Prevention** is the Key to Ensuring Food Safety

- To address the hazards as a means of prevention rather than finished product inspection, thus reduce or eliminate the risk of the hazards being realized
- The Obama administration unveiled a broad food safety agenda in July 7, 2009, pledging to recraft a national food safety system that focuses on preventing, rather than reacting to foodborne illness outbreaks
http://www.whitehouse.gov/the_press_office/Obama-Administration-Delivers-on-Commitment-to-Upgrade-US-Food-Safety-System/
- Hazard Analysis and Critical Control Point (HACCP)
 Food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product

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Key Food Safety Principles

– **Prevention** is the Key to Ensuring Food Safety

- Practice Good Personal Hygiene
 - ✓ Hand-Washing
 - ✓ Personal Cleanliness: *wear protective clothing; all injuries to food handlers are covered; should not wear jewelry*
 - ✓ Illness: *identify, report, control*
 - ✓ Personal Behavior
- Control Time and Temperature
 Limit the amount of time that potentially hazardous foods are held in the temperature danger zone during preparation - keep cold foods cold and hot foods hot
- Prevent Cross-Contamination
 Food to food; people to food; environment to food



Examples of Food Safety Controls on Some Specialty Food Products



Mexican Cheeses

- Include fresh cheeses (*Queso panela*), soft cheeses (*Queso quesillo*) and semi-soft cheeses (*Queso asadero*)
- Retain more moisture and spoil faster than firmer cheeses - a short shelf-life
- Linked to *L. monocytogenes* outbreaks
- Could contain dairy allergens
- On March 10th, 2009, FDA announced a nationwide recall for *Queso Fresco* Fresh Cheese and *Queso Cotija Molido* Mexican style grated cheese due to the possible contamination with *L. monocytogenes*



Safety Concerns for Mexican Cheeses

- Use of raw milk
The milk is not pasteurized and utilized in the preparation of the fresh and soft cheeses. Growth of *L. monocytogenes* may be conducive.
- Contamination
Cleanliness and hygiene may be issues especially if raw milk is utilized and the preparations are not done in a cold room.



Control Measures for Mexican Cheeses

- Verify if the milk was obtained from approved sources and if it has not been pasteurized
- Verify that frequent cleaning of food contact surfaces is done if preparations are not done in a cold room
- The cheese and raw milk should be refrigerated to minimize multiplication of bacteria
- Confirm that the establishment has a consumer advisory that discloses to consumers which items contain raw of unpasteurized milk and warns the consumer of the risk of consuming the product, especially by pregnant women and immunocompromised



Acidified Foods

- Low-acid foods to which acid(s) or acid food(s) are added
- Have a water activity > 0.85 and a finished equilibrium pH of ≤ 4.6 (in practice this value is usually 4.2 or below for safety reasons)
- Beans, cucumbers, cabbage, artichokes, cauliflower, puddings, peppers, tropical fruits, and fish et al.
- Are regulated under Code of Federal Regulations (CFR), Title 21 Part 114

Barriers to Achieving the Acidity

- Inadequate acid in the cover brine to overcome buffering capacity of the food
- Presence of alkaline compounds from peeling or other processing aids
- Peels, waxing, or piece size
- Oil in the product causing a barrier to penetration of the acid



Control Measures for Acidified Foods

- Assure quick and proper acidification
The food is normally cooked or heated with the acid before being filled into the final container. The final equilibrium pH must be checked, controlled and documented.
- Thermal destruction of pathogens and organisms capable of growing in and spoiling the food
The heating or pasteurization process must be done either by hot-filling the product or by the boiling water bath process. The heating temperature and time are critical factors that must be monitored, controlled and documented.
- Containers for acidified foods should be such that a hermetic seal is obtained.
Vacuum is a good indicator of a hermetic seal and helps to keep the quality of the product.
- Protect the food from recontamination

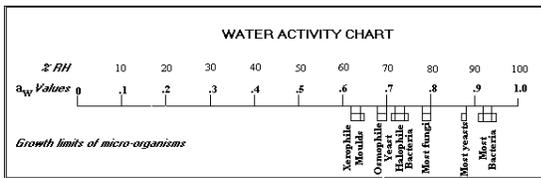


Dried Foods

- Made by removing the water from the food through the use of heat - low water activity (<0.85)
- Most commonly applied drying techniques hot-air, freeze and spray drying
- Advantages of dried foods: lightweight, space-saving, extended shelf-life and no need for refrigeration



Water Activity and Microorganisms in Foods

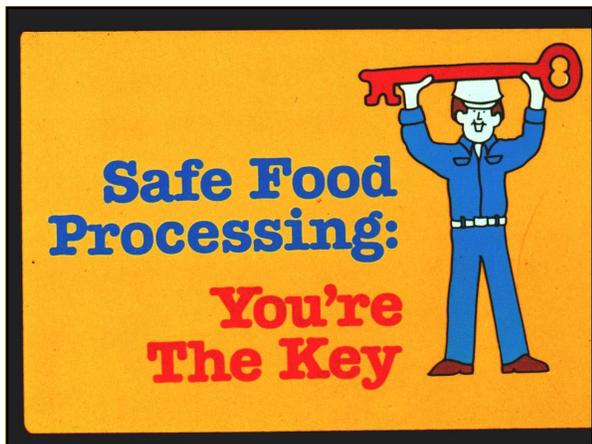


- Water activity (Aw): the availability of water to bacteria in the food
- When Aw < 0.85, most bacteria will not grow and produce toxin
- Some molds and yeasts are able to grow at Aw < 0.85, thus could cause spoilage of dried foods



Control Measures for Dried Foods

- The Aw in final product must be checked, controlled and documented
- Some dried foods are very hygroscopic, and need to be protected from moist conditions by packaging
- Hygiene is important as organisms are not necessarily killed without a thermal process



Acknowledgements

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