

Cross Contamination Mom Never Told You About

Emerging Foodborne Contaminants

Steven J. Lipton LEHP CFSP
President Biotest Services Inc.
www.Biotestservices.com

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Substances of Interest

- Norovirus
- Allergens
- Food Additives
- Seafood toxins

When do we
make false
assumptions?

**Sometimes things are not
as they seem**

Bible Quiz!!!

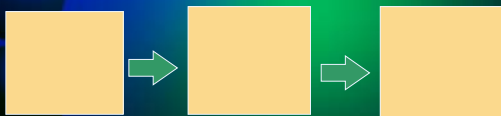
How many of each animal did
Moses take onto the ark
before the flood ?

Optical Illusions

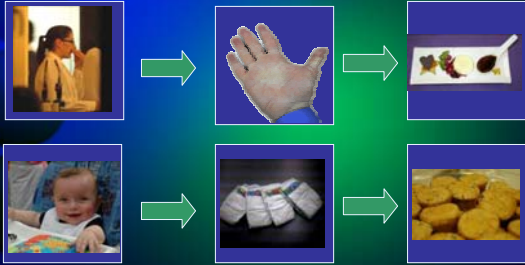


Cross Contamination

- ◆ Cross contamination is the transfer of bacteria from one place to another through contact with a surface.

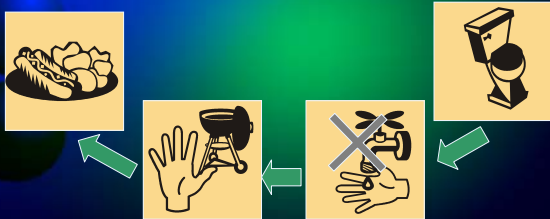


Cross Contamination



Fecal-Oral Route

- The Fecal-oral route is cross contamination from a fecal source



Norovirus Outbreaks



Norovirus

- Originally known as Norwalk virus
- 23 million cases annually
- 9 million foodborne cases annually (P. Mead et al, CDC 1999)
- Some documentation & conjecture of airborne vomitus particles
- Cross contamination of surfaces

-
-
-
-
-
-

A Cruise Ship Scenario





Why an issue

- Low infective dose (50-100 particles)
- Resistance to Sanitizing
 - Quaternary ammonia ineffective
 - 1000 PPM Chlorine
 - 60 °C (140 °F) will kill
- Person to person contact likely spread
- Front of house more an issue than back

CDC Recommendations

- There are no hospital disinfectants registered by the U.S. Environmental Protection Agency (EPA) that have specific claims for activity against noroviruses. In the absence of such products, CDC recommends that chlorine bleach be applied to hard, non-porous, environmental surfaces in the event of a norovirus outbreak. A minimum concentration of 1000 ppm (generally a dilution 1 part household bleach solution to 50 parts water) has been demonstrated in the laboratory to be effective against surrogate viruses with properties similar to those of norovirus. Healthcare facility staff should use appropriate PPE (e.g. gloves and goggles) when working with bleach.
- http://www.cdc.gov/ncidod/dhqp/id_norovirusFS.html

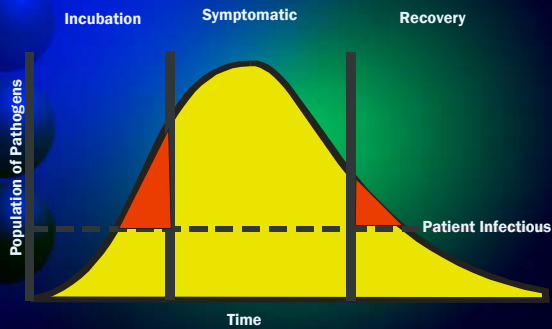
CDC recommendations

- Quaternary ammonium compounds are often used for sanitizing food preparation surfaces or disinfecting large surfaces (e.g., countertops and floors). **However, because noroviruses are non-enveloped, most quaternary ammonium compounds (which act by disrupting viral envelopes) do not have significant activity against them.**
- Phenolic-based disinfectants have been shown to be active against noroviruses in the laboratory. However, this activity may require concentrations 2- to 4-fold higher than manufacturer recommendations for routine use.¹

Potential Norovirus Hazard?



Carriers During Incubation



Who's right?



Allergens



Allergy Prevalence in U.S.

- 8% of children 6 or under
- 1-2% of adults
- 3 million Americans have peanut or nut allergies
- 30,000 trips to emergency room/yr
- 100-200 Deaths /yr
- E Coli O157:H7 50 Deaths/yr



Sources - Adult Foods

- Four foods account for 90% of reactions
 - Peanuts
 - Tree nuts (walnuts, almonds, etc..)
 - Fish
 - Shellfish





Sources- Children

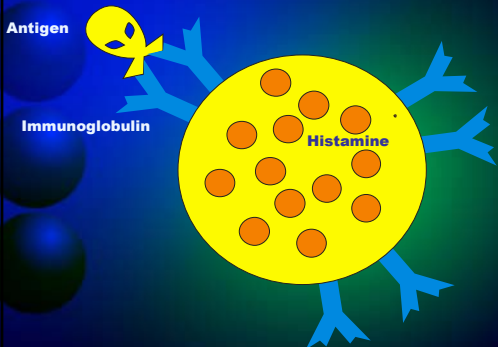
- Six foods account for 90% of food allergy reactions in children
 - Milk
 - Egg
 - Peanuts
 - Wheat
 - Soy
 - Tree Nuts








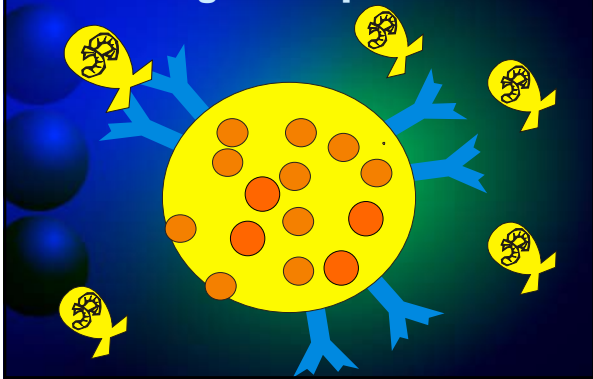
Mast Cells



Histamine



Allergen Response



Why an Issue

- Low infective dose
 - Parts per trillion in sensitive individuals
- Some proteins have high resistance to heat
- Cross contamination on cooking surfaces and in deep fryers
- Micro-Contamination even after cleaning of surfaces

Controls:

- Labeling of ingredients from manufacturer
- Storage of allergen material on lowest shelves in storage

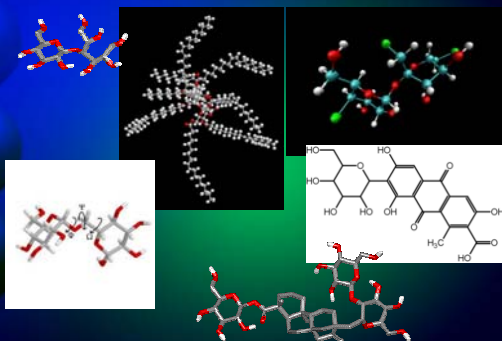
Controls: Food During Service

- Communication of Risk
 - Server training
 - Server resources
 - Buffet and self-service signage
- Children
 - Segregation of sensitive individuals.
 - Banning of food from establishments.

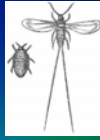
Advisories

- *“Due to our production methods, there is the uncontrollable possibility for nut residues in our non-nut products. Consumers who have any sensitivity to nuts are advised they are at risk.”*
 - Mrs Field’s Cookies
- MAY CONTAIN PEANUTS
 - Milk chocolate M&M’s

Food Additives?



Carmines



- **Cochineal** insect (*Dactylopius coccus*) produced dye
- Also known as crimson lake or Natural red 4
- FDA Food Additive



Carmines

- Originally used by Aztecs
- Used in food, cosmetics and other items
- Currently Labeled by FDA as "Natural Coloring"



Carmines

- Documented allergen
 - Documented anaphylaxis
- Combination of Cosmetics and Food



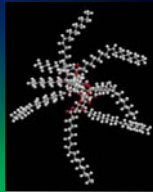
Carmine

- CSPI proposes
 - Banning
 - Labeling as “insect extract”
 - Carmine
- FDA Jan 2006 proposes “carmine” or “cochineal extract” (71 FR 4839)



Olestra

- Fat substitute
- Non- digestible fat
- Developed by Procter & Gamble



Possible effects.....

"May cause Anal Leakage"



Sugar Alcohols

- Sweet tasting compounds
- Do not break down in small intestine
- Does not contribute to blood sugar
- Popular in low- Carbohydrate foods
 - Maltitol
 - Lactitol
 - Xylitol
 - Sorbitol



Effects on body

- Over consumption may cause Bloating, gas, diarrhea
- Different sweeteners will produce symptoms at different concentrations
- Some products use a combination of sweeteners



Sucralose

- Sugar Substitute
- 500-600 times sweeter than Sucrose
- Chlorinated Sucrose
- Stable under heat & wide pH range
- Maltodextrin + dextrose + sucralose



Sucralose

- Does not Carmelize under heat
- Sugar and sucralose blends needed for some baking applications
- Approved 1998 by FDA
 - Some claims of thyroid problems
 - Often competing commercial interests

Stevia

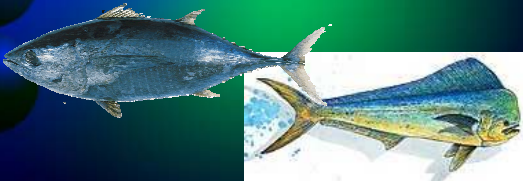
- Not a FDA food additive
- FDA Nutritional supplement
- Common Japanese Sweetner
- Extract of Stevia plant
- Not heat stable
- Some evidence of a weak mutagen

Seafood Toxins



Scombroid

- Allergy-like reaction
- Histidine → Histamine produced within fish species
- Tuna, Mahi-Mahi, Red Snapper



Scombroid - Issues

- Cooking will arrest production but will not eliminate hazard.
- Histidine heat stable (>570°F).
- Histamine stable to

Ciguatera



Pathogens: Ciguatera

- Bio-accumulation of Neurotoxin in seafood
 - Barracuda effectively banned from U.S.
- Affects sensory nerves
- Heat stable neurotoxin
- Buy from reputable vendors only CCP.

Saxitoxin

- Found in Molluscan Shellfish (PSP)
- Puffer fish near Cape Canaveral, FL
- Highly lethal toxin
 - Bioweapon – Schedule 1
- Heat Stable





Questions?

www.biotestservices.com/IEHA.html

sjlipton@biotestservices.com
