Food Safety Considerations for Value Added Tropical Fruits

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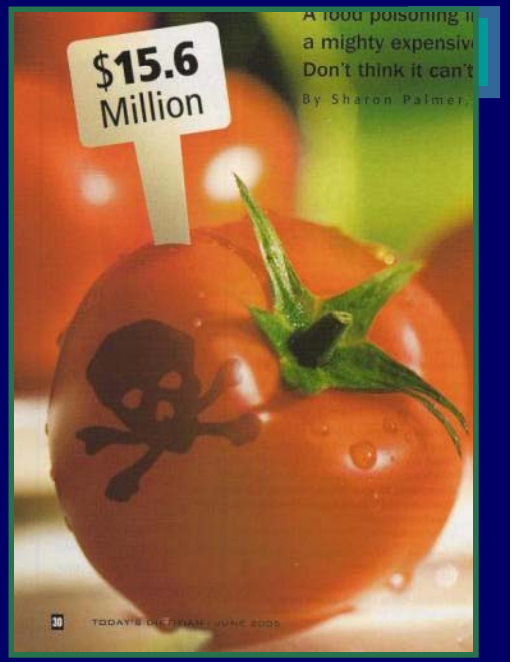
Why are we discussing food safety?

- Recent foodborne outbreaks focused the attention of regulatory, public and media's interest towards produce safety
- Outbreaks involving produce, have resulted in increased scrutiny and legal actions
- Media coverage has force companies to take reactionary measures



Foodborne Hazards

- Biological
  - Microorganisms (bacteria, viruses, parasites), plants, animals
- Chemical
  - Allergens
  - Sanitizers, additives, chemicals
- Physical
  - Rocks, wood, plastics, metal, glass

Microbiology

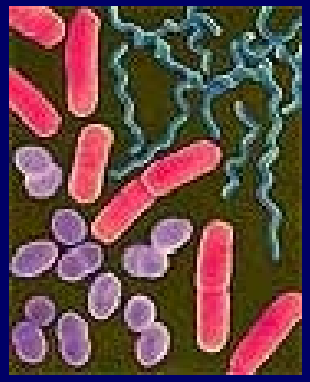
Study of organisms that are too small to be seen with the naked eye

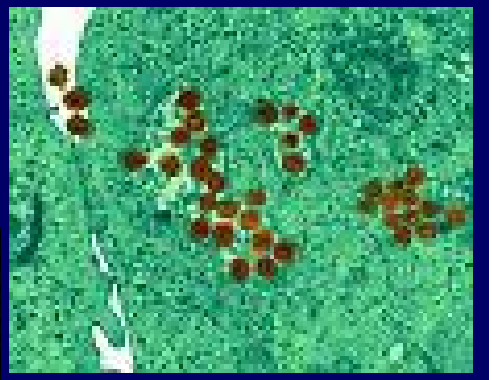
- Parasites
- Fungi (molds, yeasts, mushrooms)
- Bacteria
- Viruses
- Prions

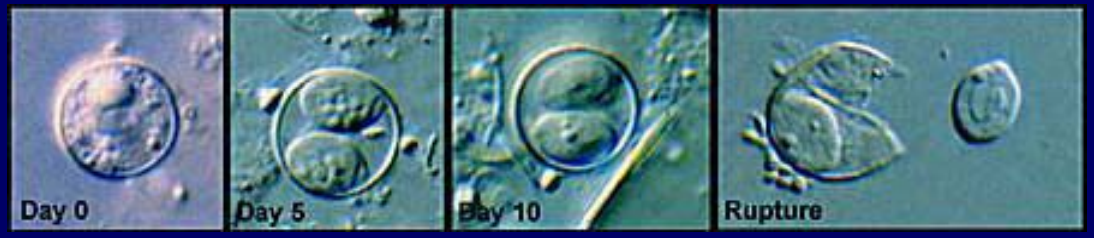
Microbiology

Study of organisms that are too small to be seen with the naked eye

- Parasites – *Cryptosporidium*, *Cyclosporia*, *Giardia*
- Bacteria – *Salmonella*, *E. coli* O157:H7, *Shigella*, *Campylobacter*
- Viruses – Norovirus, Hepatitis A







Contaminants present an “invisible challenge” because you can’t see them, and they usually don’t change the appearance, taste or odor of the food.

Sources of microorganisms in foods

Water

Soil

Air

Food Handlers

Packaging

Insects

Raw Ingredients

Surfaces

Animals

Foodborne Outbreak

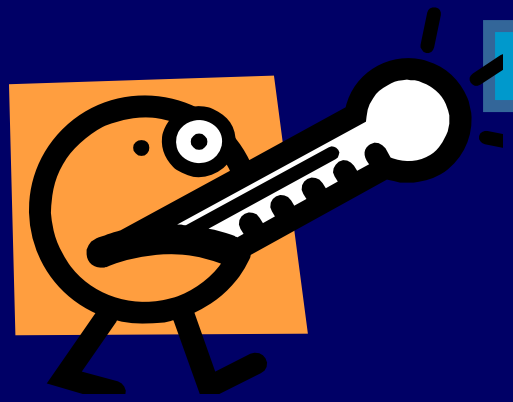
- Two or more people experience a similar illness after eating a common food
- 16 000 to 20 000 outbreaks reported per year
- 40 to 60% cause/source of infection not identified

Foodborne illness

- There exists a continuing, but preventable, burden of foodborne illness within the US.
- Trends have seen some decreases, but currently remain static

United States

- 76,000,000 cases estimated
- 350,000 hospitalization
- Approximately 5,000 deaths
- Approximately only 1:40 to 1:100 cases are ever are reported



Mead et. al, 1999

Cost of Foodborne Illness

- Personal costs
  - Human life
  - Medical costs
  - Lost productivity
  - Physical and mental
- Industry costs
  - Recalls
  - Ligation
  - Lost business

Estimated losses

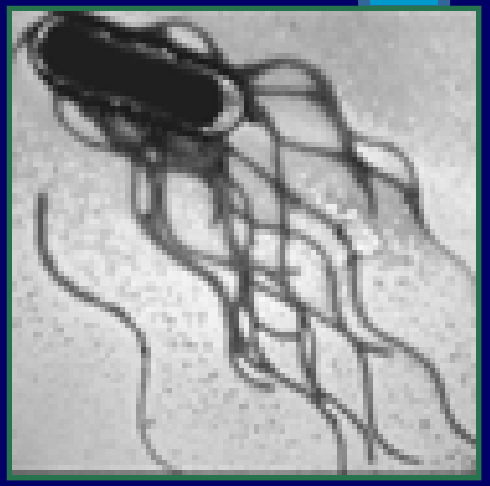
$6.5 – 35 billion

annually in USA

Estimated frequency of bacterial foodborne illness in the U.S.

Escherichia coli O157:H7	73,480 cases
Salmonella spp.	1,412,498 cases
Campylobacter spp.	2,453,926 cases
Listeria monocytogenes	2,518 cases

Escherichia coli O157:H7	61 deaths
Salmonella spp.	582 deaths
Campylobacter spp.	124 deaths
Listeria monocytogenes	504 deaths



Emerging Infectious Disease, Vol. 5, 1999. (http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm)

1996-2006 fresh produce outbreaks by commodity

Lettuce	14
Tomatoes	13
Cantaloupe	7
Raspberries/berries	6
Romaine lettuce	4
Basil	4
Green onions	3
Unknown	2

Total = 72 outbreaks

Spinach	2
Basil or Mesclun	2
Parsley	2
Melons	2
Honeydew melon	2
Mango	2
Almonds	2
Mixed lettuce	1
Cabbage	1
Green grapes	1
Snow Peas	1
Squash	1

Guzewich, FDA, 2007

1998-2006 fresh produce outbreaks

5 commodity groups make up >75 percent of produce-related outbreaks

Commodity	% produce outbreaks
Lettuce/leafy greens	30%
Tomatoes	17%
Melons	13%
Herbs (basil, parsley)	11%
Green onions	5%
Total % of 5 top commodities	76%

Guzewich, FDA, 2007

Outbreaks related to tropical fruits, world wide

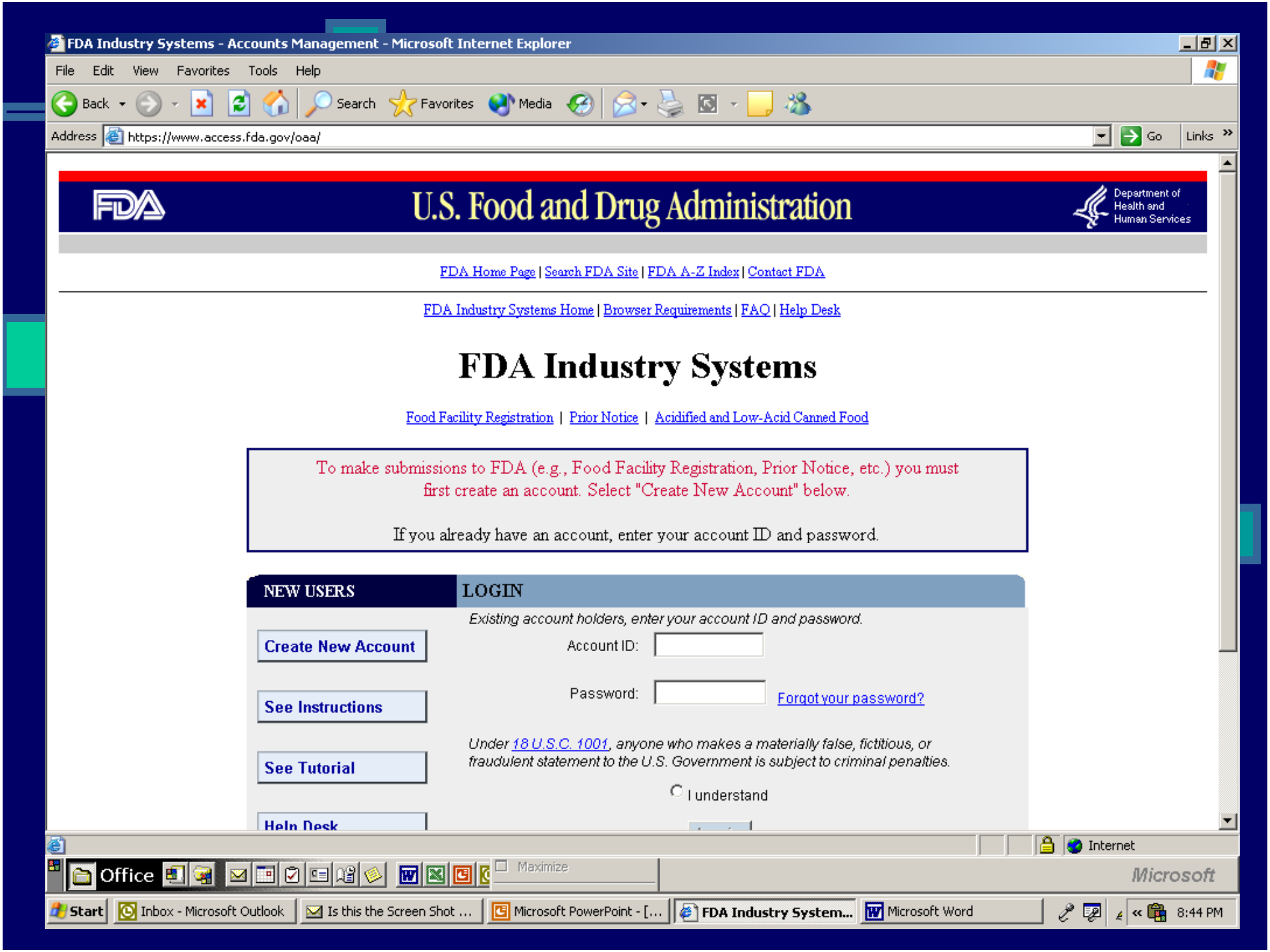
- Avocado
  - 10 outbreaks in USA 1998 – 2006 linked to Guacamole
  - Norovirus, *Camplyobacter*, *Shigella*, Hepititis A, and *Salmonella*
- Banana
  - 7 outbreaks in the USA 2002-2006 linked to Pie, Pudding and Plantains
  - Norovirus, *Staphylococcus aureus*, and *Salmonella*
- Coconut
  - 7 outbreaks world wide 1953 – 1999 linked to Dried, Milk and desheled
  - *Salmonella*, *Shigella*, and *Vibrio cholerae*

Outbreaks related to tropical fruits, world wide

- Mamey
  - 1 outbreaks in USA 1998 – 1999 linked to Frozen Smoothie
  - *Salmonella*
- Mango
  - 4 outbreaks in the USA 1998-2003 linked to Raw Imported
  - *Salmonella*
- Papaya
  - 2 outbreaks world wide 1996 – 2009 linked to Fresh-cut
  - *Salmonella*
- Pineapple
  - 8 outbreaks world wide 1994 – 2006 linked to Fresh-cut
  - Norovirus, E. coli, Campylobacter and *Salmonella*

What do I need to do?

- Once you “add value” to your product, you become a food processor
- Following the 2002 bioterrorism act you must register with FDA, if you are not already registered
- www.fda.gov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To make submissions to FDA (e.g., Food Facility Registration, Prior Notice, etc.) you must first create an account. Select "Create New Account" below.
If you already have an account, enter your account ID and password.
NEW USERS
LOGIN
Existing account holders, enter your account ID and password.
Create New Account
Account ID:
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See Instructions
Under 18 U.S.C. 1001, anyone who makes a materially false, fictitious, or fraudulent statement to the U.S. Government is subject to criminal penalties.
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FDA Registration Requirements

- Public Health Security and Bioterrorism Preparedness and Response Act of 2002 ("The Bioterrorism Act")
  - Section 305: Registration of food facilities
  - Section 307: Prior notice of imported food shipments
  - Section 303: Administrative Detention
  - Section 306: Establishment and Maintenance of Records

Sec. 305: Registration of Food Facilities

- Who Must Register?
- Owners, operators, or agents in charge of domestic or foreign facilities that manufacture/process, pack, or hold food (subject to FDA's jurisdiction) for human or animal consumption in the U.S.
  - Domestic facilities
    - interstate commerce
    - intrastate commerce

Failure to Register

- Failure to register, update, or cancel a registration as required is a prohibited act

- FDA can bring a civil or criminal action

What else should you do?

- As a grower:
  - Implement Good Agricultural Practices during production and harvesting

Good Agricultural Practice

- Commonly called GAP or GAPs
- Should be considered an “Insurance Policy”, not a burden
- Basic GAPs are a collection of common sense, easy to implement practices.
- Many are already being performed by prudent growers when performing daily tasks

Basic tenets of GAPs

1. Pesticides and there use
2. Employee Hygiene and Training
3. Field Sanitation and Harvesting Practices
4. Water
5. Soil, Manure & Biosolids
6. Vertebrate Pest control
7. Traceability/Records/Documentation

What else should you do?

- As a grower:
  - Implement Good Agricultural Practices during production and harvesting
- As a packer/ while adding value
  - Implement Good Manufacturing Practices/ Standard Sanitation Operating Procedures

Current Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (1968)
  - Title 21
  - Code of Federal Regulations (CFR)
  - Part 110
    - 21 CFR 110
    - http://www.access.gpo.gov/nara/cfr/waisidx_06/21cfr110_06.html

Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (21 CFR Part 110)
  - General Provisions
    - Definitions
    - Personnel

Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (21 CFR Part 110)
  - General Provisions
  - Buildings and Facilities
    - Plant and Grounds
    - Sanitary Operations
    - Sanitary Facilities and Controls

Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (21 CFR Part 110)
  - General Provisions
  - Buildings and Facilities
  - Equipment and Utensils

Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (21 CFR Part 110)
  - General Provisions
  - Buildings and Facilities
  - Equipment and Utensils
  - Production and Process Controls
    - Raw Materials
    - Manufacturing Operations
    - Warehousing and Distribution

Good Manufacturing Practice

- GMP in Manufacturing, Packing, or Holding Human Food (21 CFR Part 110)
  - General Provisions
  - Buildings and Facilities
  - Equipment and Utensils
  - Production and Process Controls
  - Defect Action Levels

Newer Approaches

- Hazard Analysis Critical Control Point (HACCP)
  - Mandated for Meat and poultry, seafood, and juices
    - Requires pre-requisite programs
    - Requires written and documented SSOPs
- Example in recent FDA regulation
  - 21 CFR 120

Sanitation Standard Operating Procedures

- Sanitation controls - Each processor shall have and implement a sanitation standard operation procedure (SSOP) that addresses sanitation conditions and practices before, during, and after processing

SSOP Requirements

- Mandatory sanitation monitoring of eight (8) key areas with record keeping
- Mandatory corrective actions with record keeping

Eight Key SSOPs

1. Safety of water
2. Condition and cleanliness of food-contact surfaces
3. Prevention of cross-contamination
4. Maintenance of hand-washing, hand-sanitizing and toilet facilities
5. Protection from adulterants
6. Labeling, storage and proper use of toxic compounds
7. Employee health conditions
8. Exclusion of pests

What does this mean for you?

- Food safety hazards have been associated with value-added tropical fruits, and some value-added tropical fruits allow *Salmonella* to grow
- You must register your facility with FDA
- Become familiar with GAPs during production
- Become familiar with GMPs/SSOPs during processing

Questions?