

Food Safety Produce Rules – How Preventive Controls work From Farm to Fork

9th Dubai International Food Safety Conference

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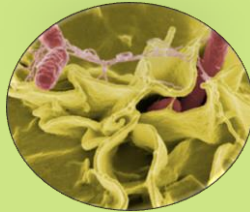
University of California, Davis

NOVEMBER 10, 2014

Overview



Background



Outbreaks



Sources of
Pathogens
and
Interventions



Summary

Food Regulations

- ▶ Food Safety Modernization Act, 2011
- ▶ 8 food safety regulations including
 - PRODUCE SAFETY RULE
 - Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption
 - PREVENTIVE CONTROLS RULE
 - Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Human Food



Implementation

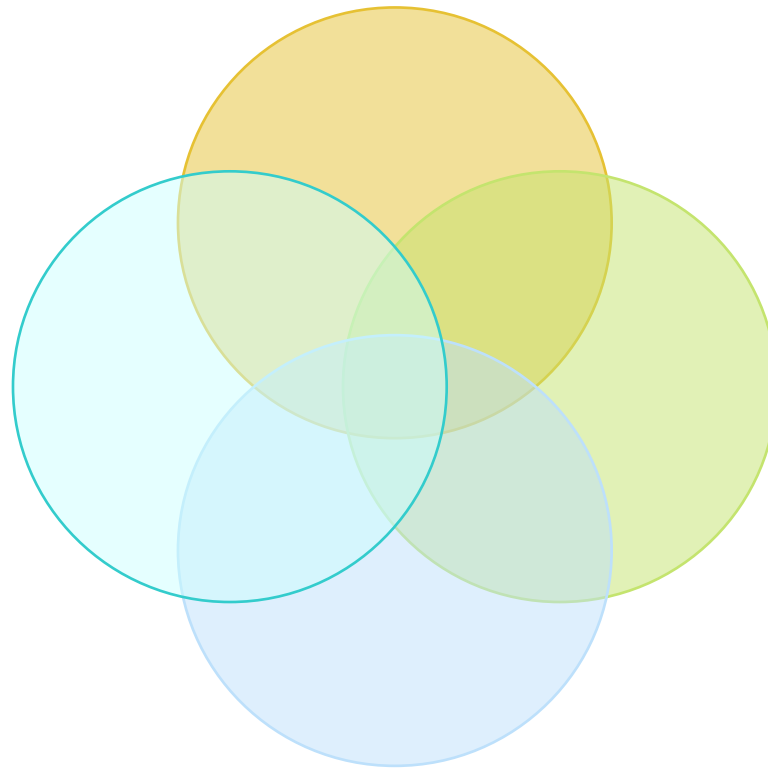
- ▶ Produce Safety Rule
 - Final expected October 2015
 - Implementation through 2020
- ▶ Preventive Controls Rule
 - Final expected August 2015
 - Implementation through 2018



Main Themes of the Legislation



Prevention

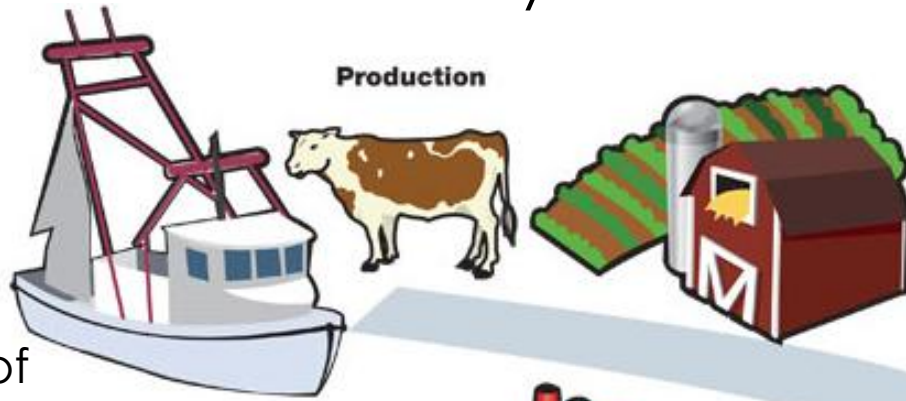


**Enhanced
Partnerships**

**Inspections,
Compliance,
and Response**

Import Safety

Food Safety Modernization Act Covers:



Production

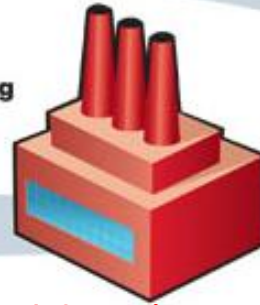
Production, Harvesting and Packing Raw Agricultural Commodities

Distribution of All FDA Foods

Distribution



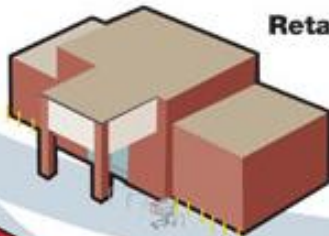
Processing



Further Processing All FDA Foods including Produce

NOT: Food Service and Retail – State Regulated

Retail



Home Consumers



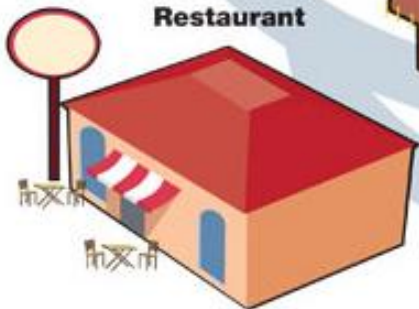
Home Preparation



Restaurant Consumer



Restaurant



Restaurant Preparation



“PRODUCE”

Plant Products In



Fruits



Culinary Herbs



Vegetables



Sprouted Seeds



Mushrooms



Tubers

Plant Products Out



Oil seeds

Dried Culinary Herbs and Spices



Cereals and Grains



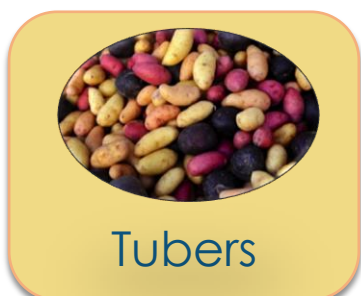
Legumes



Tree nuts

“PRODUCE SAFETY RULE”

Plant Products In



Special Categories



Postharvest Options

Can

Preserves

Pasteurized
Juice

Ferment



Fruits
Vegetables

Fruits
Vegetables
Herbs

Fruits
Vegetables

Fruits
Vegetables

Postharvest Options

Freeze



Fruits
Vegetables
Herbs

“Fresh”
Juice



Fruits
Vegetables

Freshcut



Fruits
Vegetables
Herbs

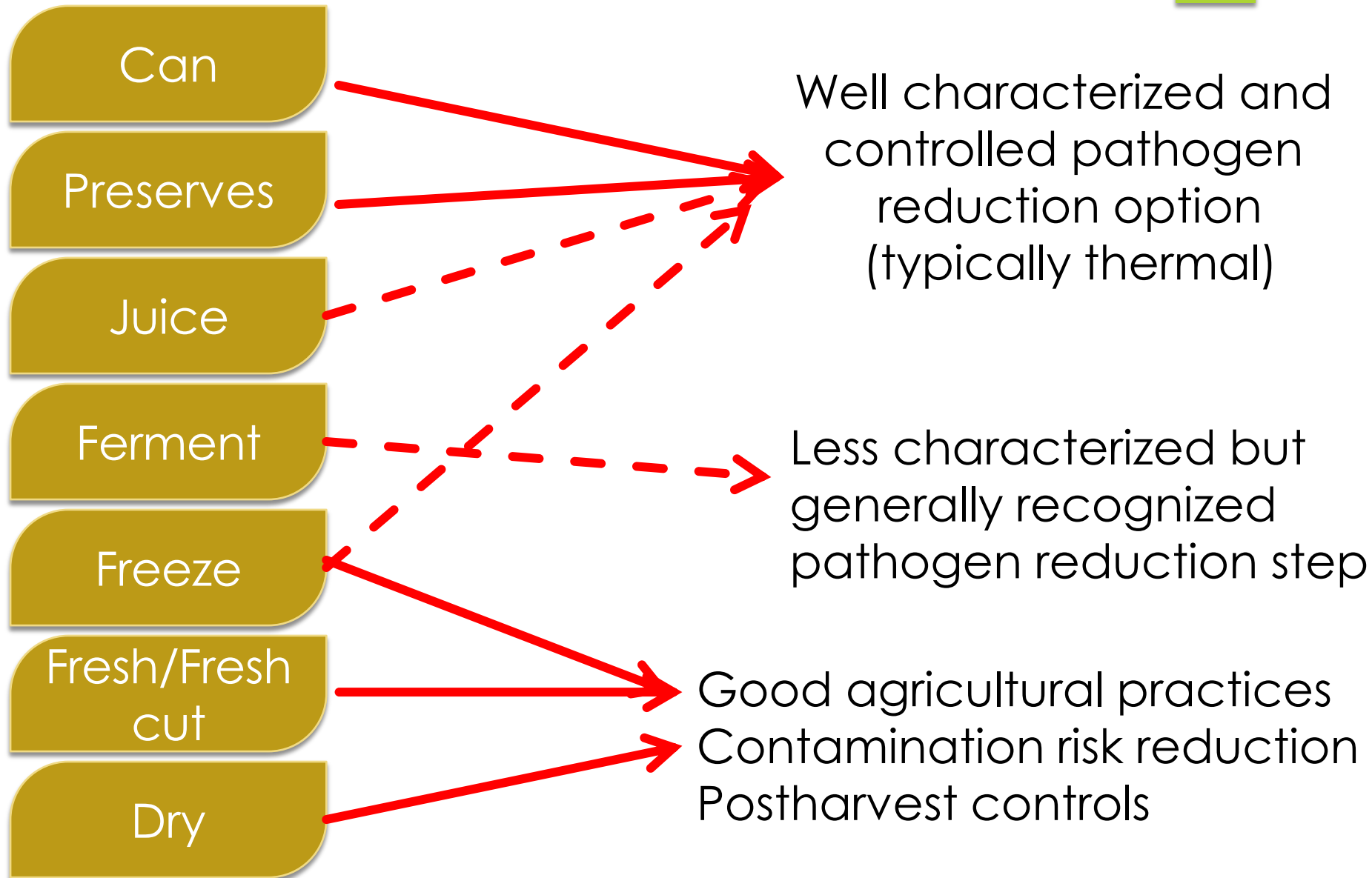
Whole



Fruits
Vegetables
Herbs

Managing Pathogen Risks in Produce

Postharvest Pathogen Control



Final Preparation Options

Cooking



Fruits
Vegetables
Herbs

Juicing



Fruits
Vegetables

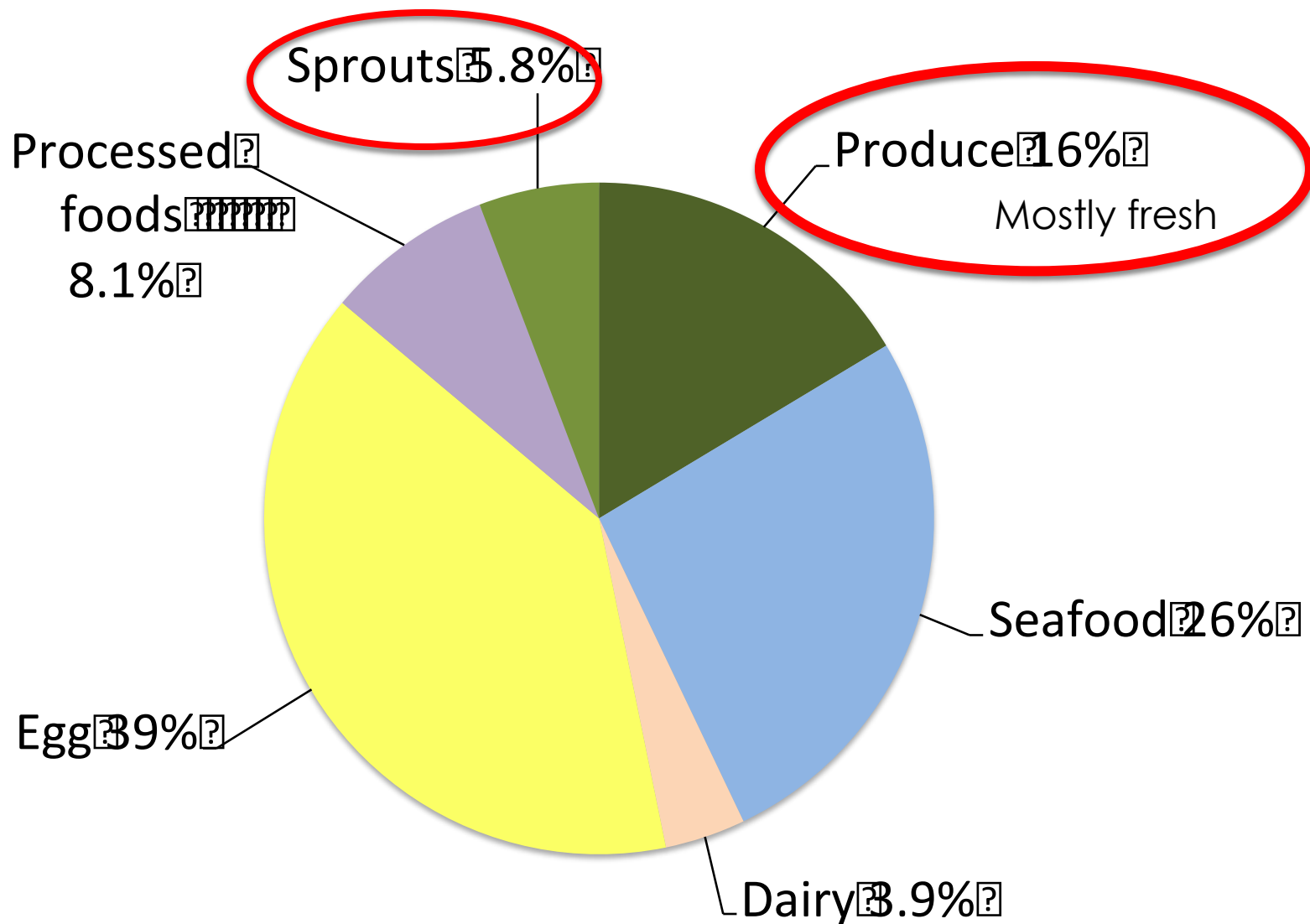
Fresh



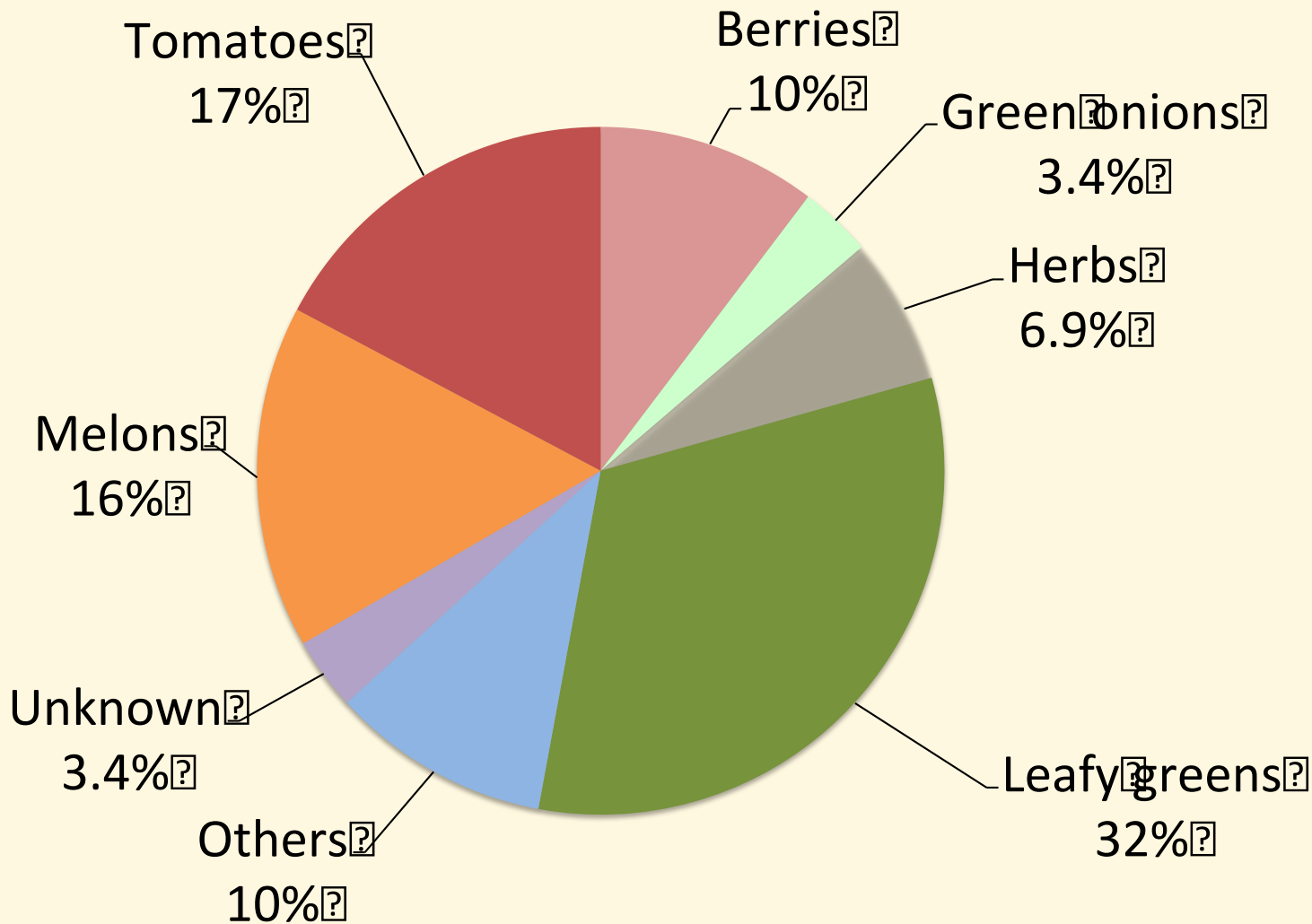
Fruits
Vegetables
Herbs

No Kill Step

Reported outbreaks of foodborne illness linked to FDA-regulated foods by vehicle 1996-2009 (N=532 outbreaks)



Types of fresh produce associated with outbreaks of foodborne illness 1996-2009 (N=87)



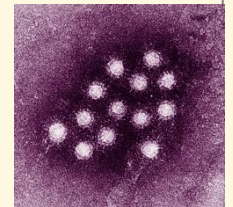
E. coli O157:H7



Salmonella



Listeria



Hepatitis virus

Source Credit FDA/CFSAN 2011, CDC

Common Produce/Pathogen Pairs

Sprouts



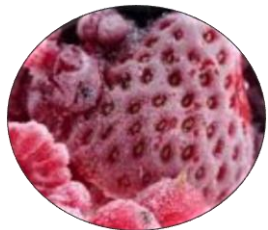
Leafy greens



Tomatoes



Berries



Melons



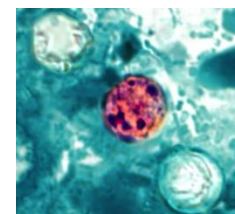
Leafy Herbs



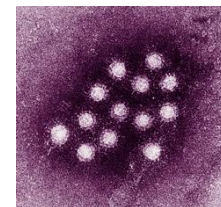
Salmonella



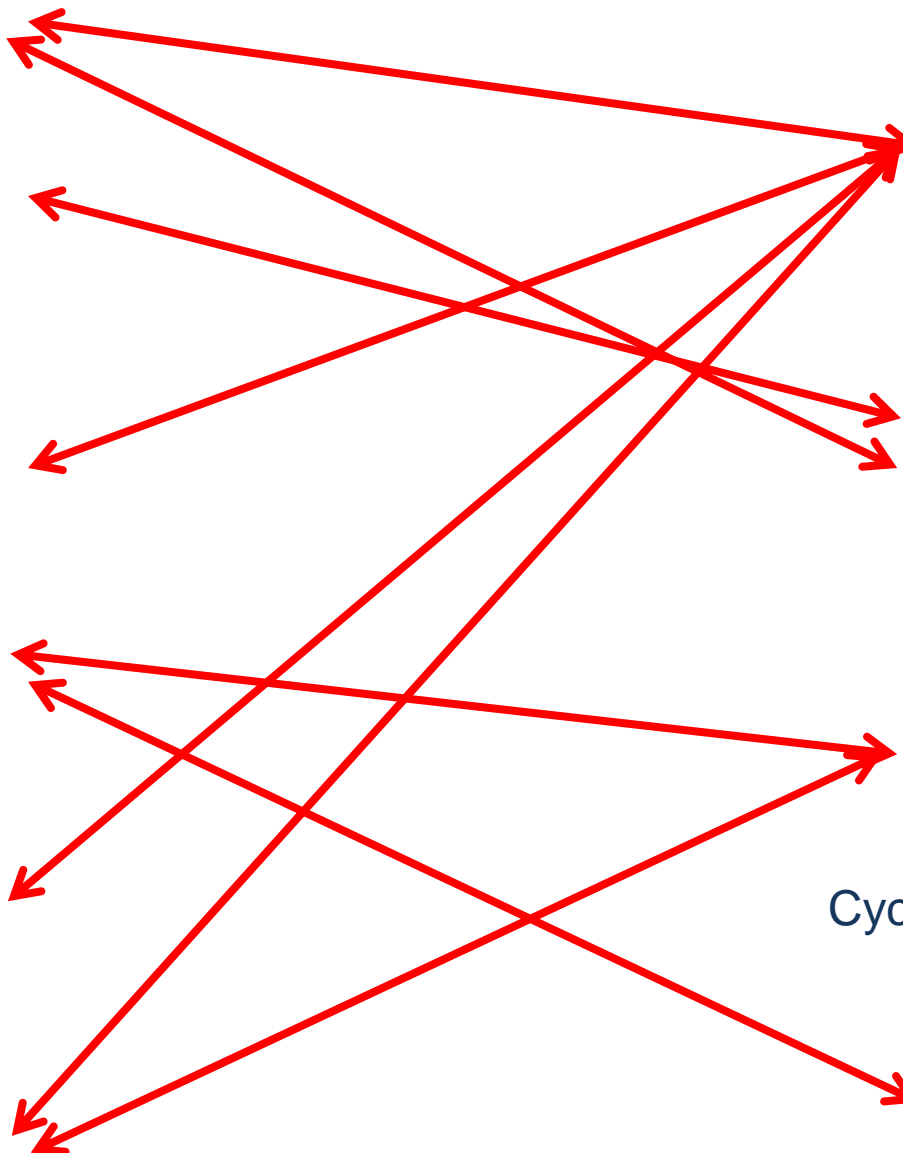
E. coli O157:H7



Cyclospora/parasites



Hepatitis virus/viruses



Enteric (Fecal) Pathogens (partial list)

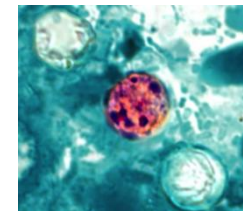
Pathogen Multiply in Foods?	Enteric Source	Infectious Dose	Sequelae
BACTERIA			
<i>Salmonella</i> spp. YES	human animals	10 - 100,000	Reactive arthritis
<i>E. coli</i> O157:H7 (EHEC) YES	human animals	10 - 1,000	HUS
<i>Shigella</i> YES	Human	10 - 100	Dysentery
PROTOZOA			
<i>Cryptosporidium</i> NO	human animals	<20	Severe diarrhea
VIRUS			
Hepatitis A NO	human	10 - 100	Jaundice



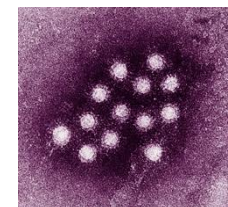
E. coli O157:H7



Salmonella

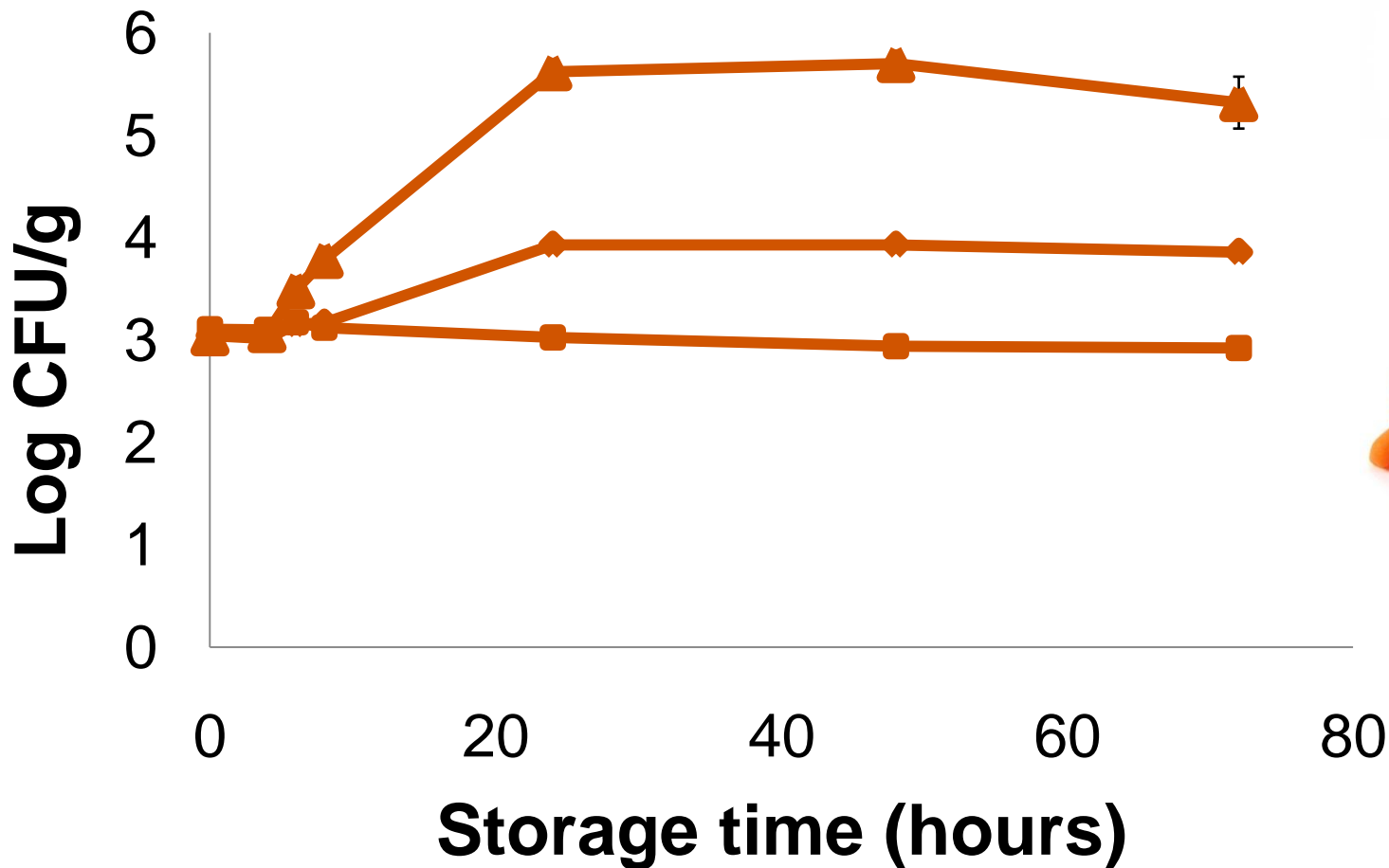


Cyclospora/parasites



Hepatitis virus/viruses

Survival/Growth of Pathogens in Fresh Produce



Survival/Growth of Pathogens in Intact Fresh Produce

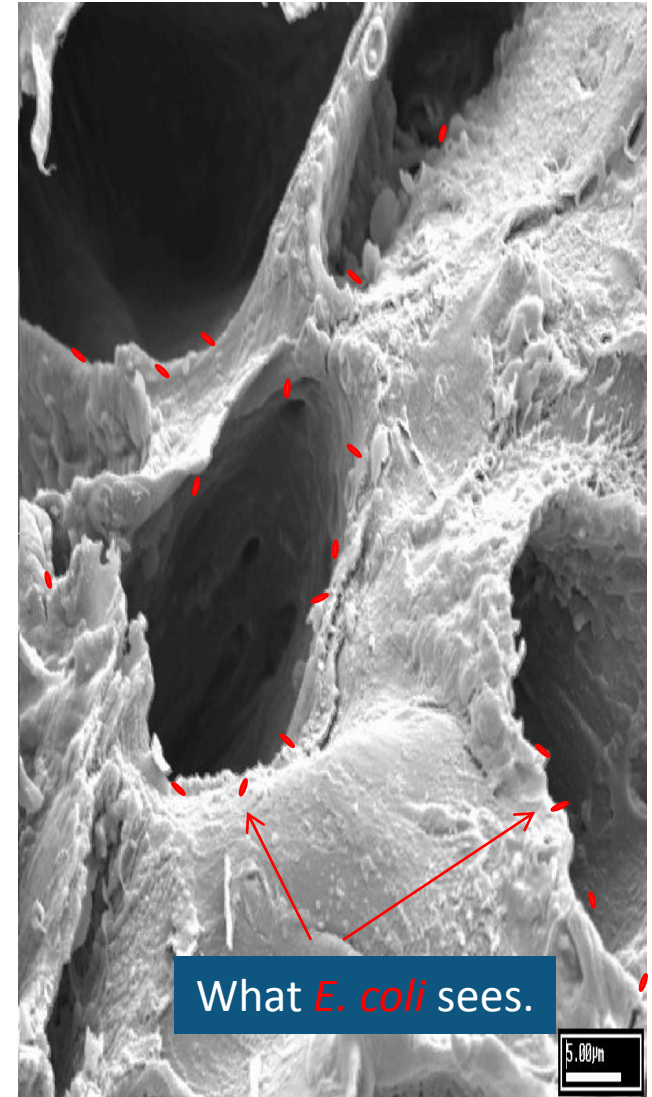
Condition		Survival	Growth
Intact		Variable	Rare
Wounded		Enhanced	Possible
Temperature			
	Warm	Decreased	Enhanced
	Cold	Enhanced	Slowed
Humidity	High	Enhanced	Enhanced
	Low	Decreased	Decreased

Growth of Pathogens in Cut Fresh Produce

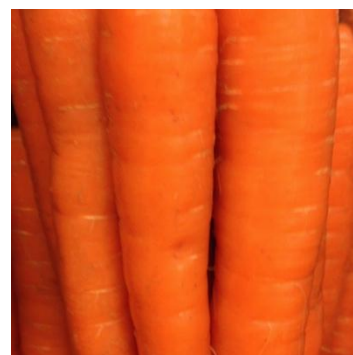
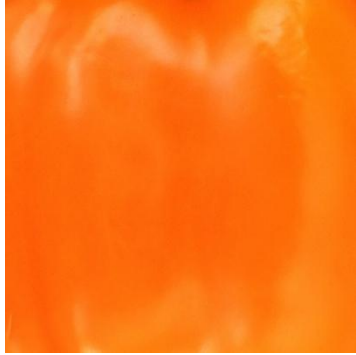
pH	Growth at Elevated Temperature	Example
High	Rapid	Sprouts, melon, chopped herbs, cut lettuce
Low	Slow but possible	Chopped tomatoes, apples

Fresh Postharvest Handling

- Removal of microorganisms is difficult because produce surfaces are complex



Surface Characteristics



What are the sources of contamination?



Fresh Produce Preharvest/Harvest: Primary sources of contamination

Water

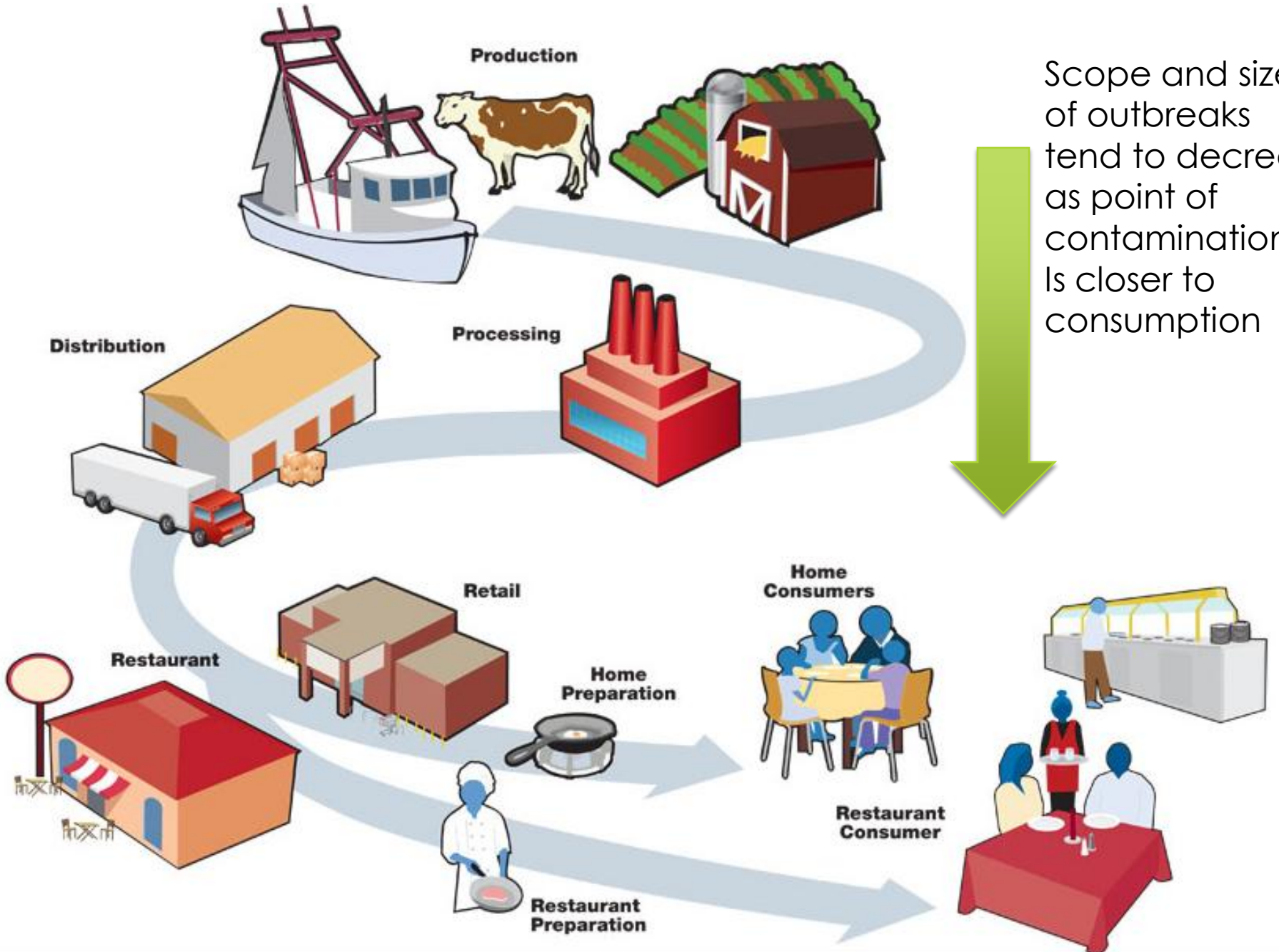
Soil
Amendments

Wildlife

Workers



Contamination can Occur Throughout the Supply Chain



Scope and size of outbreaks tend to decrease as point of contamination is closer to consumption

Good Agricultural Practices

- ▶ Focus is on RISK REDUCTION
 - Prevent contamination where possible



Postharvest Management Focus:

- Preventing Spread of Contaminants
- Preventing Introduction of Contaminants

Water Quality Management



Sanitation



Worker Hygiene



Cold Chain Management

Good Packinghouse Practices

Food Service Management Focus:

- Preventing Spread of Contaminants
- Preventing Introduction of Contaminants

Supplier Control

Sanitation
Water Quality

Worker Hygiene



Cold Chain Management

Produce Food Safety



Very important to the diet



Many processing options



Raw produce risks reduction require
Integrated preventive approach

Question?