Reference:

- What Is the Importance of Food Safety and Sanitation? retrieved Feb. 9, 2019 from https://www.reference.com/food/importance-food-safety-sanitation-9c78517e9be1325e

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hazards

FOOD SAFETY

The assurance that illnesses will not result from consuming foods [due to naturally occurring and accidentally introduced hazards] when it is prepared and consumed according to its intended use.

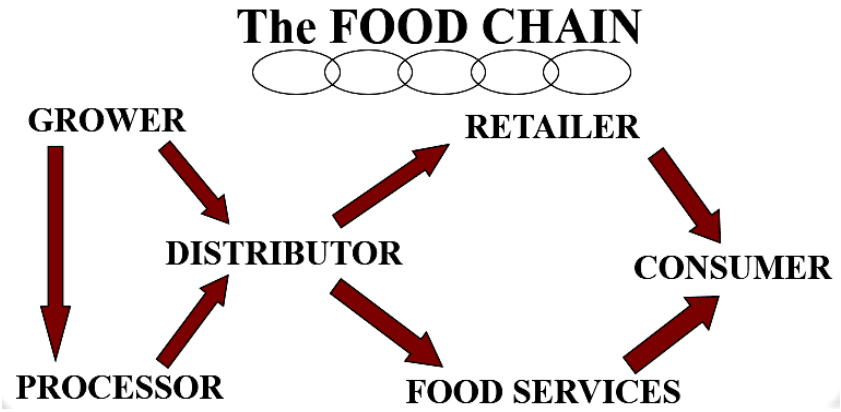
FOOD SAFETY HAZARDS IN FOOD

HAZARDS:

- Refers to the potential agents or contaminants present in the food that can cause food borne illness or even death, especially to the vulnerable population.
- Three (3) types: Physical, chemical or microbiological contaminants
- RISK. The probability of the hazard to occur in food and also its impact on human health.

FRESH PRODUCE (CROPS, FISH, MEAT)

- Can be contaminated with HAZARDS at any point along the food chain.



To prevent contamination or hazards in food, a set of standard practices or guidelines were developed to establish sanitary conditions in the manufacture of food, ingredients, production and other food contact materials to assure consumer that food products/ingredients produced are clean, fresh and wholesome. These are GAP, GHAP, GAqP, GMP/ SSQP/HACCP, ISO, TQM.

Food Safety is a shared responsibility among producers, processors and consumers.

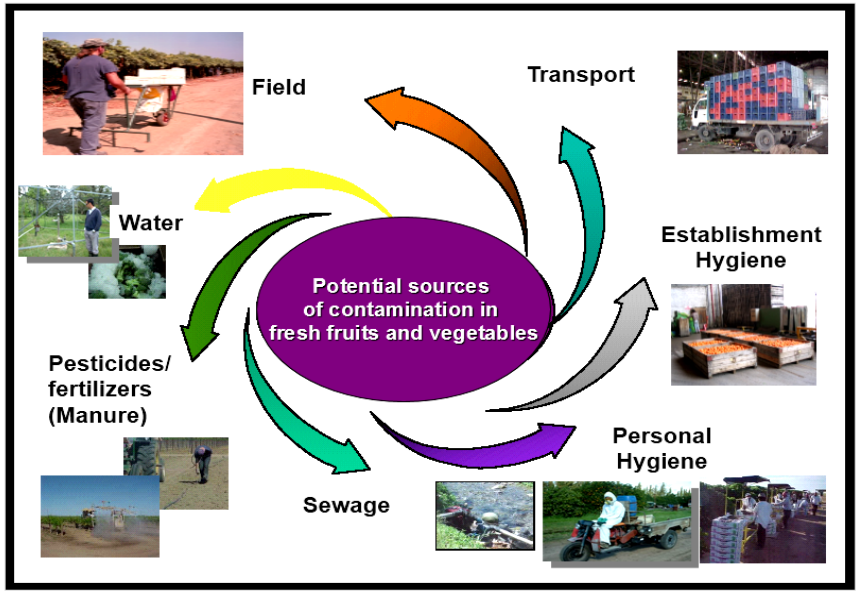
"Let Food be thy medicine and Medicine be thy food"

Hippocrates

3. PHYSICAL HAZARDS

- Any extraneous object or foreign matter in a food item which may cause illness or injury to a person consuming the product. Physical hazards can cause cuts, choking, broken teeth, etc. (glass, metals, plastic pieces, stones, bone splinters, fruit pits, seeds, personal effects).
- Preventing Common Physical Hazards

  a. Inspect raw materials and food ingredients
  b. Handle food according to GMPs
  c. Eliminate potential sources of physical hazards in the processing and storage areas
  d. Establish an effective maintenance program for the equipment in your facility to avoid sources of physical hazards



Types of Hazards

1. MICROBIOLOGICAL HAZARDS

- Pathogenic organisms that cause human illnesses
- Examples: Bacteria (*E. coli, Salmonella, Listeria, campylobacter*), Protozoa (Amoeba), Virus (Hepatitis A), Helminths (Ascaris)
- Effects and Possible Source

Biological Hazard	Effect on human Health	Source of Contamination
Salmonella sp.	Diarrhea, abdominal pains, chills, fever, vomiting, dehydration	Animal manure, infected workers, water
E. coli	Diarrhea, vomiting, similar to cholera	Oral-fecal contamination, sewage, animal manure
Listeria sp.	Perinatal infection, septicemia, meningitis, meningo encephalitis, abortion	Animal manure, infected food handlers, contaminated water
Hepatitis A Virus	Fever, nausea, jaundice	Oral-fecal contamination, water

2. CHEMICAL HAZARDS

- Any chemical contaminants or naturally occurring substances in food that can cause harm to human health when present over the recommended level.
- Chemical Substances
  - Pesticides (insecticide, fungicide)
  - Heavy metals (lead, mercury, cadmium)
  - Oxidizing agents (peroxide, sulfites)
  - Naturally occurring substances (hydrocyanic acid, phasin, goitrin)
  - Stress metabolites (solanin, isocoumarin, ipomeamarone, aflatoxin/mycotoxins)
- Effects and Possible Source

Hazard	Sources of Contamination
Pesticide residues in produce exceeding MRLs –	• Incorrect mixing - concentration higher than label rate • Pesticide not registered/approved for target crop • Witholding period not observed • Equipment incorrectly or not calibrated
Residues present for pesticides not registered/ approved for use on produce	• Spray drifts from adjacent crops • Pesticide in soil from previous use • Pesticide residues in picking bins or crates • Equipment not cleaned after use • Multipurpose use of equipment • Dumping, accidental spillage or seepage of pesticide into soil or water source
Heavy metal residues exceeding maximum levels (MLs) • Mercury (Hg) • Lead (Pb) • Cadmium (Cd) • Chromium (Cr)	• Continued use of phosphate-based fertilizers with high levels of heavy metals (Cd) • High levels of heavy metals in the soil naturally or in previous use (mining, dumpsites) • Soil conditions conducive to uptake of heavy metals by crops – e.g, acidity, salinity, zinc deficiency, use of gypsum, organic matter are predisposition factors for increased absorption of Cd by the roots

Hazard	Sources of Contamination
Stress Metabolites • solanine (potato) • isocoumarine (carrots) • mycotoxins/ aflatoxin (corn, peanuts, soybeans) • Ipomeamarone (sweet potato)	• Unsuitable storage conditions: – potatoes stored in light – carrots in storage with high ethylene producers – high humidity/high temperature storage of corn, peanuts, soybeans – bacterial disease affecting the tuber
Non-pesticide chemical contamination	• Chemical and fertilizer spills on pallets • Leakage of chemicals and fertilizers transported with produce • Oil leaks and grease on equipment in contact with the produce • Spillage of chemicals- e.g, vermin control chemicals near produce or packaging materials • Residues in picking containers used to store chemicals, fertilizers, oil, etc.

- Pesticide residues - harmful to human if it exceeds international standards set by the FAO/WHO:
  - Maximum residue limit (MRL) (mg chemical/kg commodity) refers to maximum concentration of a pesticide residue recommended to be legally permitted on foods/feeds resulting from the use of a pesticide;
  - measure of the residues at the time of the harvest;
  - means to determine whether GAP was followed in the use of pesticides when the commodity enters the market.
- Why too much pesticide residues in crops (Pesticide Management Survey, NCPC, UPLB)
  - spraying more often than recommended
  - using higher concentration than recommended
  - use of “cocktails”
  - use of pesticide not recommended for the crop
  - harvesting very close from application
  - dipping crops in pesticide solution
  - Effects and Possible Source