Hazard Analysis Critical Control Points and Plant Sanitation

I. HACCP: Systematic evaluation of the entire food processing continuum, identification of critical points for control to be exerted, development of responses to loss of control, and systems for monitoring control and reestablishing control when lost[1] **(pg. 497-506)**

A. HACCP is proactive: develop safe foods by identifying likely risks/hazards prior to production and establishing processes to control/eliminate the threats to food safety presented by these risks

1. Biological: microorganisms/foodborne pathogens
2. Chemical: toxins, foreign compounds
3. Physical: foreign matter (glass, steel, wood)

B. Prerequisite programming: activities that have positive impact(s) on product safety, even if not directly; not part of HACCP

1. Examples:
    a) Ingredient supplier/microbiological specifications of ingredients
    b) Grounds, facility maintenance
    c) Employee training & hygiene
    d) Sanitation schedules/process of sanitizing
    e) Good Manufacturing Practices (GMP) utilization (www.fda.gov)
2. Mandatory HACCP use:
    a) Processed, pasteurized juices (2001 Final Rule, FDA): 5-log cycle process required for target pathogen (e.g. apple cider, *E. coli* O157:H7)
    b) Seafood (1995)
    c) Meat/poultry: fresh and processed (1996) (9 CFR 304)
3. Voluntary: Dairy (NCIMS voluntary HACCP plan) C. 7 principles of HACCP processing of foods:
    1. Perform a hazard analysis of process, identifying risks throughout process
    2. Identify critical control points (CCPs)

---

1 For more info., visit: www.cfsan.fda.gov/~lrd/haccp.html

a) CCP1: Required to ensure hazard control

b) CCP2: Required to minimize possible hazard threat

3. Establish critical limits for CCPs: prescribed tolerances met to ensure CCP controls hazard
4. Establish monitoring procedures to regularly observe processing of foods within limits of CCP or to identify when process goes outside of CCP
5. Define corrective action(s) needed for CCPs when loss of control occurs to bring process back into control
6. Establish verification procedures to ensure proper adherence to HACCP plan and effectiveness of HACCP plan to produce safe product

a) Verification: procedures, not including monitoring, that determine the validity of a HACCP plan to produce intended product safety and ensure HACCP plan parameters are consistently achieved

(1) End-product testing

(2) Lot sampling at stages throughout

b) Validation: verification focused on collecting and evaluating scientific/technical data for the development of a process capable of producing desired/required level of product safety

(1) Scientific peer-reviewed published research articles

(2) Letters from qualified scientists providing evaluation of process efficacy

(3) In-house or contracted scientific studies quantifying the risk reduction gained by processing measures

(4) Constant monitoring and use/interpretation of microbial indicators

7. Establish record-keeping procedures to document HACCP plan adherence and product safety according to HACCP

II. Plant Cleaning and Sanitation: Processing environments require routine cleaning and sanitation to maintain aseptic processing environment and minimize risk of crosscontamination of product with spoilage or pathogenic microorganisms.

A. Cleaning and sanitation go hand-in-hand!

1. Incomplete cleaning → potential for food residues to remain on processing surfaces
2. Ineffective sanitation will slowly result in increased numbers of surfacecontaminating microbes, leading to increased contamination of processed product.
3. Sanitation cannot overcome negative impacts of ineffective cleaning!
4. Cleaning alone is not sufficient to result in substantial reductions of various microbes; optimal results achieved when both cleaning and sanitation are employed! B. Cleaning **IS NOT** sanitation!

1. Cleaning: process of removing food residue from processing surfaces by the use of water (heated, pressurized) and process-appropriate detergents a) Removal of gross soils with water rinsing
   b) Application of detergent to loosen and suspend fats/breakdown and release protein
   c) Scrubbing to dislodge
   d) Rinsing of fine soils and suspended fats from surfaces
2. Sanitation: treatment of food contact surfaces and/or process environment with sanitizers to destroy vegetative pathogenic microbes and reduce the numbers of other contaminating microbes significantly a) Chemical sanitizers
   (1) Chlorine: Oxidizing agent used commonly to disinfect surfaces in various food processing operations (a) Chemical forms:
   i) Hypochlorite (NaOCl) & hypochlorous acid (HOCl)
   ii) Chlorite (NaO_2Cl) iii) Chlorine Dioxide (ClO_2): gaseous form (b) Food contact applications:
   i) Produce surface decontamination, processing water disinfection
   ii) Poultry carcass chiller water, carcass rinse iii) Meat carcass disinfection (not commonly used versus organic acids, hot water, steam)

(c) Mechanism: oxidizing molecule