Design, Monitor, and Enforcement of a Food Safety System for
Dry Fruits and Nuts

Dr. Hany Khalil
USDA
Professor of Food Science
California Polytechnic State University
San Luis Obispo, California

Objective

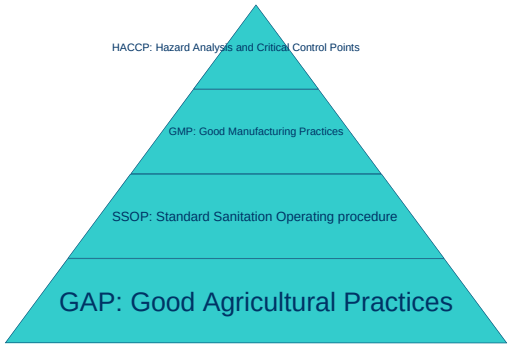
- To illustrate a step-wise process to design a food safety system, monitor its effectiveness and enforce it if needed

Safe FooD
From Farm To Fork

Presentation Outline

- 1. Standard Sanitation Operating Procedure- S.S.O.P.
- 2. Good Manufacturing Practices- G. M. P.
- 3. Hazard Analysis and Critical Control Points- H.A.C.C.P.
- 4. Conclusion
- 5. Q & A

➢Food Safety Pyramid



➢Components of a Food Safety System

- GAP, SSOP and GMP are prerequisites for developing a HACCP plan
- First, we will review SSOP and GMP
- Second, we will review HACCP - *the capstone of food a safety system*

1. S.S.O.P. For Almonds Processing

I. Sanitation Procedures and Evaluation
II. General Considerations
III. Cleaning Equipment and Machinery
IV. Sanitize Processing Lines Frequently
V. Clean Product Storage Areas Regularly
VI. SSOP Equipment Cleaning Procedure Form
VII. SSOP Equipment Cleaning Frequency Form

I. Sanitation Procedures and Evaluation

- The first order of business is to designate a sanitarian, or other qualified individual, preferably one that has satisfactorily completed a certified food sanitation program
- That person should be in charge of writing formal plans and procedures

I. Sanitation Procedures and Evaluation, cont. 1

- Sanitation procedures must be documented, posted and enforced by management
- They should describe:
- chemicals used and mixing instructions
- equipment cleaning procedure
- contact time required
- Adequacy of cleaning must be evaluated, documented, and verified by a designated supervisor

II. General Considerations

- These are points for management and the designated sanitarian to consider as they outline the SSOP plan:
- 1- Sanitation Standard Operating Procedures (SSOP's) refer to sanitation procedures taken to prevent product contamination or adulteration- eliminating or minimizing microbial contamination is the main challenge
- 2- Plant sanitation must address facility environment, processing equipment, and all employees

II. General Considerations, Cont.1

- 3- These practices or procedures must be documented to validate that almond product safety was maintained during production-*Why*?

✓ For the internal needs of an operation documentation is the most efficient and accurate way to confirm that employee duties have been performed

✓ Documentation is also vital for external regulatory credibility as well as customer assurance

III. Cleaning Equipment and Machinery

- Almonds come in contact with equipment frequently for long periods, and therefore they must be the focal point of the cleaning and sanitation

➢ Cleaning:

- All sorting, grading, and packing equipment in contact with almonds may contaminate the almonds
- Used processing equipment brought from storage should be cleaned and sanitized immediately before used
- Equipment and tools used for cleaning should be dedicated exclusively for raw or processed areas

IV. Sanitize Processing Lines Frequently

➢ Sanitizing:

- Every processing line should be sanitized with an effective bactericide prior to daily start up
- There should be documentation that the sanitizing solution is effective against pathogenic organisms such as *Salmonella, E. Coli*

V. Clean Product Storage Areas Regularly

- Now we move away from the equipment and the processing line to the storage area
- Remove, as much as practical, all visible debris, soil, dirt, and unnecessary items from product storage areas on an ongoing basis
- Bins should be cleaned and sanitized between uses even when bin liners are used.
- In no case should a bin used for incoming nuts be used for in-process nuts or finished products

VI. SSOP Equipment Cleaning Procedure Form

For every piece of equipment develop a form for cleaning procedure

At a minimum, the form should list:

- ✓ The steps to be taken
- ✓ The person who performs the procedure
- ✓ The date and signature of that person

SSOP Equipment Cleaning Procedure

Equipment: _____

Frequency: _____

Required man-hours: _____

Required chemicals: _____

Procedures:

Date:	Initials:	
		Lockout tag procedure for power
		Check for and remove all edible products from the work area
		Wear proper protective equipment
		Follow all label and MSDS precautions for chemicals
		Check for oil leaks on all gearboxes and motors, report problems to maintenance supervisor and complete action slip
		Vacuum all equipment and motors to remove loose debris
		Cover all motors and gearboxes with plastic coverings
		Steam or clean with approved cleaning chemicals
		Scrub with brushes and other cleaning tools as needed
		Paint external surfaces when dry

Signature: _____ Date: _____

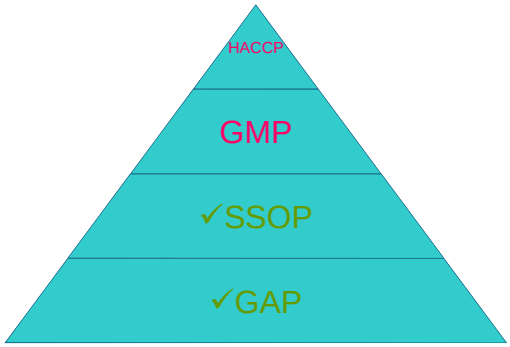
Supervisor Signature: _____ Date: _____

VII. SSOP Equipment Cleaning Frequency Form

SSOP Equipment Cleaning Frequency Form

Equipment	Daily	Weekly	Bi-Weekly	Monthly	Bi-Annually	Annually	Remarks

Food Safety Pyramid



2. GMP- Good Manufacturing Practices

- We will continue with the California almond Industry as a model
- Why have a GMP?
- "By maintaining and documenting Good Manufacturing Practices (GMP's), California almond processors can assure government regulators and customers worldwide that their industry is diligent in its commitment to offer safe, high-quality nuts"

G.M.P., Cont.1

- GMP's are the requirements necessary to ensure the production of wholesome food
- They are written and organized with regard to the US FDA GMP Regulations, Code of Federal Regulations (21 CFR 110)
- The objective is risk reduction for a product eaten in a raw form

G.M.P., Cont. 2

- Microbiological Hazards
- Almonds can become microbiologically contaminated at any point along the farm-to-table food chain. The most common source of microbial contamination is associated with human or animal feces
- Water, which comes in contact with food products, may be a potential source of microbiological contamination
- Water can be a carrier of many microorganisms including pathogenic strains of *Escherichia coli*, *Salmonella*, *Vibrio cholerae*, *Shigella*, *Cryptosporidium parvum*, *Giardia lamblia*, Norwalk and hepatitis A viruses
- Even small amounts of contamination with some of these organisms can result in food borne illness

GMP Sections

- There are six sections to developing GMP guide
- **Section I: Personnel**
- **Section II: Plant and Grounds**
- **Section III: Toxic Chemicals and Pest Control**
- **Section IV: Water, Sewage, Toilets, Handwashing**
- **Section V: Design, Construction and Maintenance**
- **Section VI: Controls**

GMP Section I: Personnel

- Implementing a list of guidelines that are posted and enforced by the plant management will eliminate most of the potential contamination associated with employees and visitors to your plant
- Examples of Personnel Hygiene Guidelines:

GMP Section I: Personnel, Cont.1

- 1. Employees must wear outer garments that are clean and protect against contamination of almonds, almond contact surfaces or almond packaging materials
- 2. All employees are to wear effective hair restraints including hairnets, beard and mustache covers where applicable
- 3. All employees must wash hands with soap and warm water before work, after using restrooms
- No employee infected with or showing symptoms of any infectious or communicable disease, or that demonstrate open sores shall be in contact with almonds almond surfaces or almond packaging materials

GMP Section II: Plant and Grounds

- **Grounds:**
- 1. Grounds must be free of trash and debris
- 2. Grounds must have adequate grading and/or drainage to avoid standing water.
- 3.Vegetation should be controlled to prevent pest harborages

GMP Section II: Plant and Grounds, Cont. 2

- **Plant:**
- 1. Ensure that all glass lights in processing and warehouse areas are shielded or otherwise protected against almond contamination in case of glass breakage
- 2. Ensure that floors, walls, and ceilings are constructed of appropriate materials that can be adequately cleaned

GMP Section III: Toxic Chemicals and Pest Control

- **Chemicals:**
- Managers need to identify which employees handle hazardous materials and conduct training on proper handling
- Chemicals which may contact almonds or almond contact surfaces (such as lubricants) must be food grade
- The plant should maintain an inventory and Manufacturer Data Safety Sheets (MSDS) for all chemicals used in the plant

GMP Section III: Toxic Chemicals and Pest Control, Cont. 1

- **Pest Control:**
- All animals, including mammals, birds, reptiles, and insects, are potential sources of contamination in processing environments because they harbor, or could be a vector for a variety of pathogenic agents, such as *Salmonella* or *E. coli*.
- A good pest control program is essential to good plant sanitation

GMP Section IV: Water, Sewage, Toilets, Hand washing

- **Water can Clean – or Contaminate**
- Water used in food processing is required to be safe and sanitary. This water must meet drinking water standards for microbiological activity
- Plant water from a ground source should be tested at least once a year for pesticides, heavy metals and microbiology

GMP Section IV: Water, Sewage, Toilets, Hand washing, Cont.1

- **Toilets:**
- 1. Each almond facility must provide employees with adequate, readily accessible toilet facilities
- 2. Toilet facilities must not have doors that open into areas where food is exposed to airborne contamination
- 3. Toilet facilities must have self-closing doors

GMP Section V: Design, Construction and Maintenance of Equipment and Utensils

- Almonds are constantly in contact with the surfaces and utensils in the facility
- 1. All almond contact surfaces must be made of food compatible materials resistant to deterioration by cleaning and sanitizing agents
- 2. Equipment and utensils must be designed so as to provide access for cleaning
- 3 Equipment must be well maintained, with no rust, excess lubrication, flaking paint, etc.

GMP Section VI. Controls

- **1. Trace back**
- Traceback is the ability to track almonds, back to their source (growers, huller/shellers, etc.)
- A system to identify the source of almonds cannot prevent the occurrence of a microbiological hazard, however, the ability to identify the source of a product through traceback serves as an important component of GMP
- Information gained from traceback investigation may also be useful in identifying and eliminating a hazardous pathway

GMP Section VI. Controls, Cont. 1

- **2. Positive Lot Identification**
- A key element of a traceback program is positive lot identification. In the event of a foodborne illness associated with your product, the ability to quickly trace the product will minimize the impact to your operation in terms of production delays, product recall/retrieval costs, and negative public opinion

GMP Section VI. Controls, Cont. 2

- **3. Allergen Control- Why an allergen program?**

- Tree nuts are among the eight most allergenic foods responsible for 90% of food allergies.
- While afflicting a small percentage of the overall population, food allergies, particularly to peanuts and tree nuts, can be severe and even fatal
- Even if a person is not allergic to almonds, he or she may be allergic to other types of nuts. Therefore, it is very important for handlers to ensure that no other nuts – even in small amounts – are processed with or come in contact with almonds

Q & A

Thank You