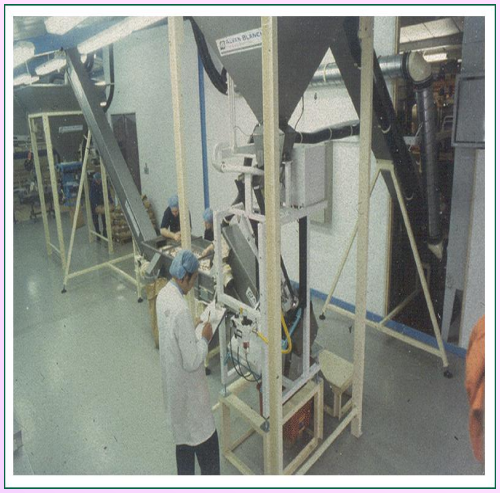
มหาวิทยาลัยเกษตรศาสตร์
KASETSART UNIVERSITY

GOOD MANUFACTURING PRACTICEs



(GMPs)

WARAPA MAHAKARNCHANAKUL, Ph.D.
Assistant Professor
Dept. of Food Science and Technology
Kasetsart University

GMPs or cGMP **defines as the measures of general hygiene as well as the measures of the prevent food from becoming adulterated due to unsanitary condition.**

The Development of GMP in Thailand

- **Thai GMPs are adopted from the principle of hygienic practices according to Codex.**
- **Thai GMPs are the mandatory regulations which all food plants should be compliance since 2000.**

Comparison between Thai GMP and Codex GMPs

Codex

1. Objectives
2. Scope/Uses/Definition
3. Primary Production
4. Design and Facilities
5. Operation Control
6. Maintenance and Sanitation
7. Personal Hygiene
8. Transportation
9. Information and Consumer Communication
10. Training

Thai GMP

1. Premises , Surrounding and Building
2. Machines, Equipments and Utensils
3. Sanitation Facilities
4. Process Control
5. Maintenance and Cleaning
6. Personal Hygiene

GOOD MANUFACTURING PRACTICEs (GMPs)

-Is to reduce the risk of contamination of food product during *processing, handling, packing, storage and transportation*

- Broad and general in nature

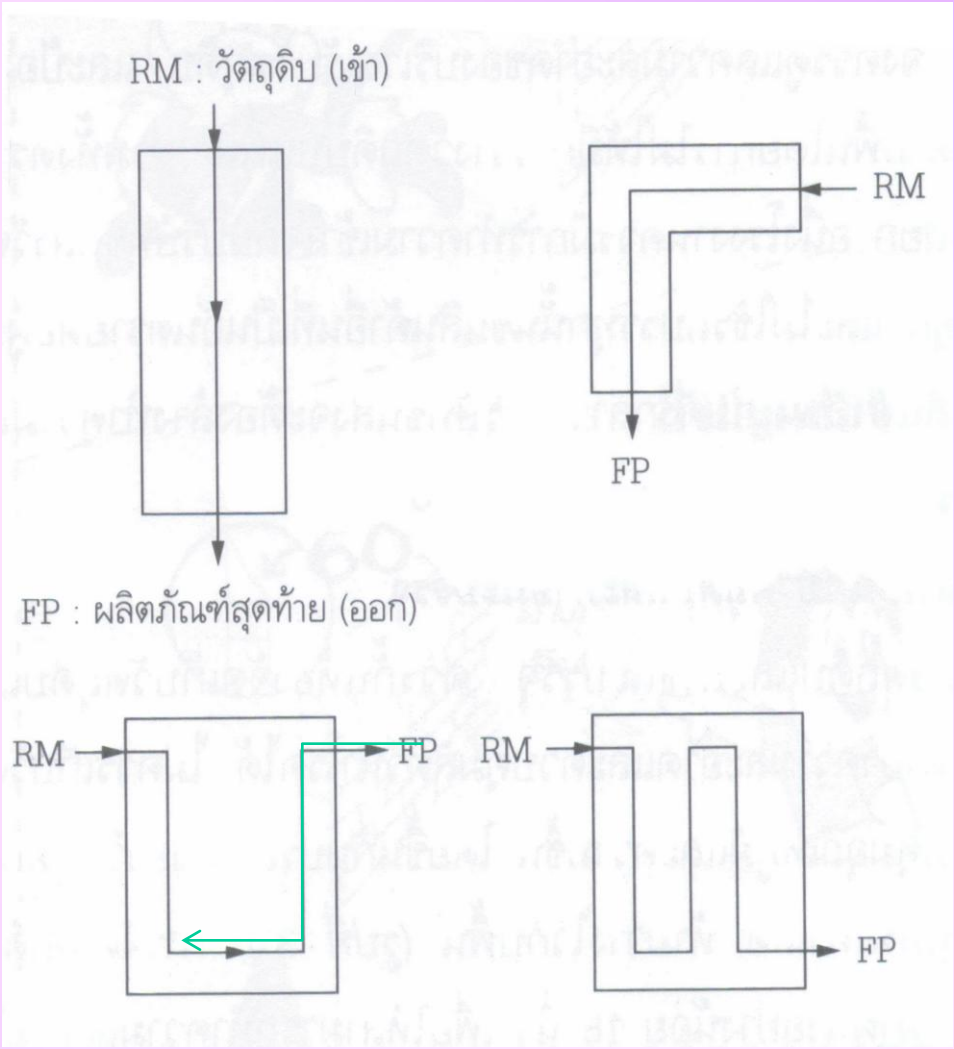
- Do not require record keeping, but need some information providing for monitoring of hazards controls

- Assist to guide the development of SOPS and SSOPs

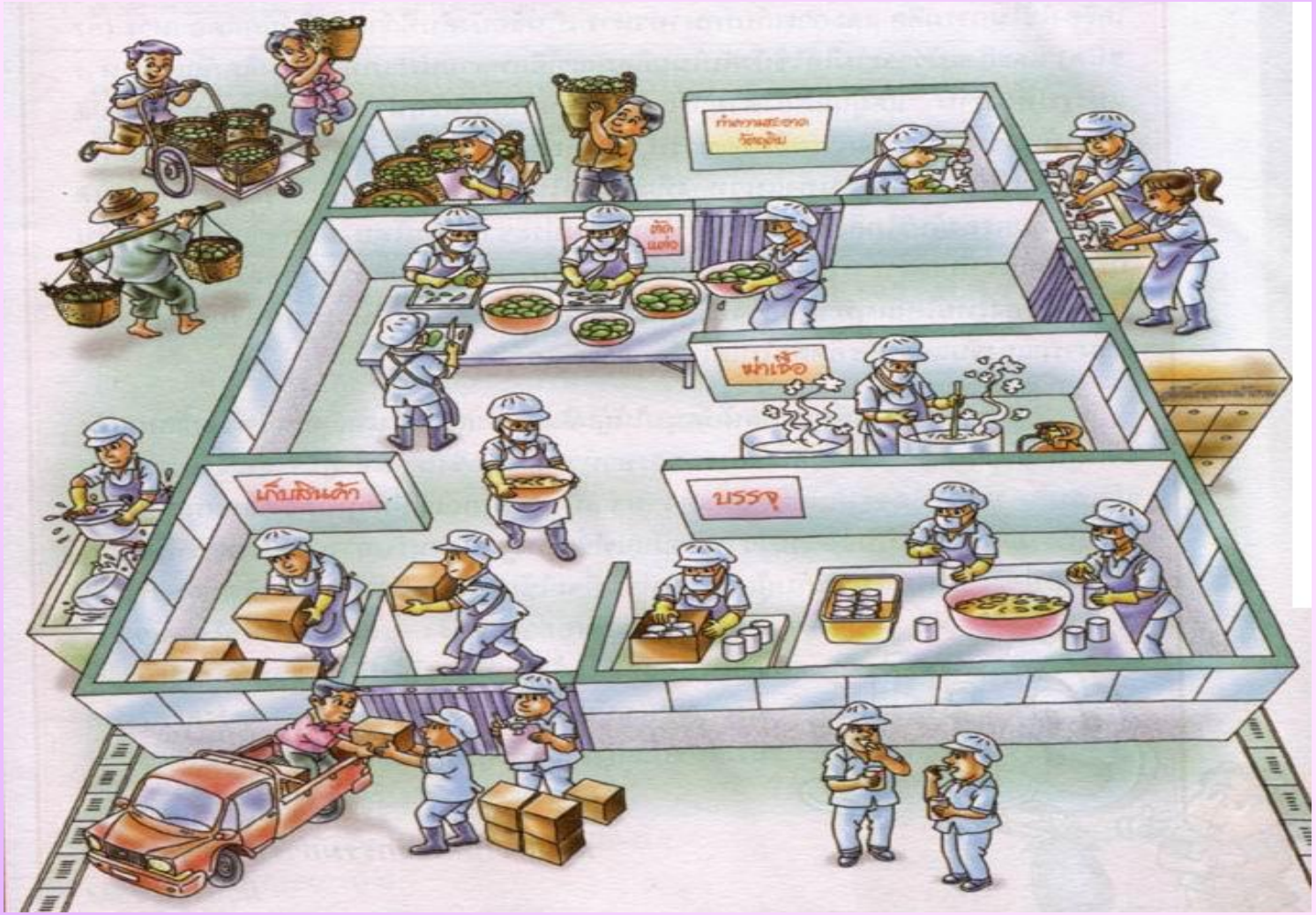
1. Premises, Surrounding and Building

- The entire location, neighboring properties surrounding areas , structure(s) and equipment need to be considered.
- the main focus is
  - *To prevent potential contaminate from incoming into contact with food product*
- Contaminants may be airborne contaminants
- Farms, Waste dispose , Flooding area
- Overhead condensate, Chipping points, Rust Dusts

- **The facilities should be designed so that product flows in one direction only**
- **Should be separated**
  - raw ingredients
  - their containers
- **Should be separated**
  - waste
  - and their source
  of contamination



The facilities should be designed so that product could flow in one direction only, each area have to be separated and convenience to work , prevent recontamination have to be concerned.



- All ingredients should be kept in appropriate temperature and relative humidity
- Keep away raw ingredients from finished product
- Accessibility of storage area must be considered

Easy accessible

Pest control

Keep away from floor

FIFO

Buildings should be well screened with barriers designed to exclude vermin, domestic and wild animals, including birds and insects.

No waste was collected in processing areas and plant surrounding.

Sanitary construction considerations for processing, packing and storage facilities

- **Lamps and bulb lights should be covered .**
- **The floor should be constructed with a slight slope to avoid water accumulation.**
- **The sewage system should be constructed to prevent waste accumulation in processing , packing and storage rooms.**

Recommendations for the proper chemical storage:

- **All chemical agents, such as fuels, additives, fertilizers, pesticides, sanitizers, etc. must be packed in durable containers, properly labeled, and stored in dry, clean, closed places**
- ***separated from food products and packing material.***
- **These supplies must be handled only by authorized personnel.**

Recommendations for the proper maintenance of packing and storing facilities

- **Packing and storage areas should be separated and , ideally, different personnel should handle separate tasks to avoid cross-contamination.**
- **Comprehensive Sanitation Standard Operating Procedures (SSOPs) and maintenance programs should be implemented.**
- **Pest control and monitoring should be in place.**

2. Machines, Equipments and utensils

All equipments, utensils and food contact surfaces have to be proper designed and easily to clean.

- The design should be easy to access and clean .
- The schedule of replacement of worn parts and maintenance of equipment should be planed.
- If equipment has any paint on it, the paint should be approved for food processing equipment and it should not chip easily.
- Rust should be removed so it will not flake off onto the product.
- Oil leaks and over-lubrication must be avoided.
- Only food grade oil and lubricants should be used.

2. Materials and design

- All equipment and containers that come in direct contact with food or ingredients should be stainless steel or plastic.

- Equipment must have smooth surfaces .

- It is a good practice to assign a responsible individual to each piece of equipment so that person can become familiar with the equipment and its proper operation.

Good Manufacturing Practices for containers:

- **Containers should be made of non-toxic materials.**
- **Containers used for transporting food should be cleaned and disinfected after each use.**
- **Containers that have been in direct contact with soil, mud, compost or fecal material should be properly marked and should not enter the receiving or packing facility at any time.**
- **Containers used for food, particularly fresh produce, should not be used to transport any other materials.**

Good Manufacturing Practices for containers: (cont.)

- **Within the packing facility, it is a good practice to color code or label containers that are used for transporting the product before and after washing and keep them well separated to avoid cross contamination.**
- **Pest control and monitoring of infestation should be considered during container inspections.**

3. Process control

- Written specification should be in place for all food additives, food ingredients and packaging materials.
- All supplier must be compliances to all laws, and assure that they have food safety program and GMPs in place .
- Some ingredients may be necessary to require proof of safety prior to acceptance.

  - COA, a letter of guarantee and other means of documents
- On going audit program may be needed.

Process Control

Production, storage, handling and transportation of finished product

- All foods have to be done under the hygienic practices.
- Prevent the cross-contamination .
- Prevent spoilage by control temperature and humidity.
- Temperature must be monitored and recorded.

4. Sanitation Facilities

4.1 Water, ice and steam

- Potable and non-potable water system need to approve a quality and maintenance as necessary.
- Sanitizers that added to all water contact food or food contact surface is needed.
- Water use in production area should be a potable water and the quality compliance to the standard.
- Using water in hygienic manners.

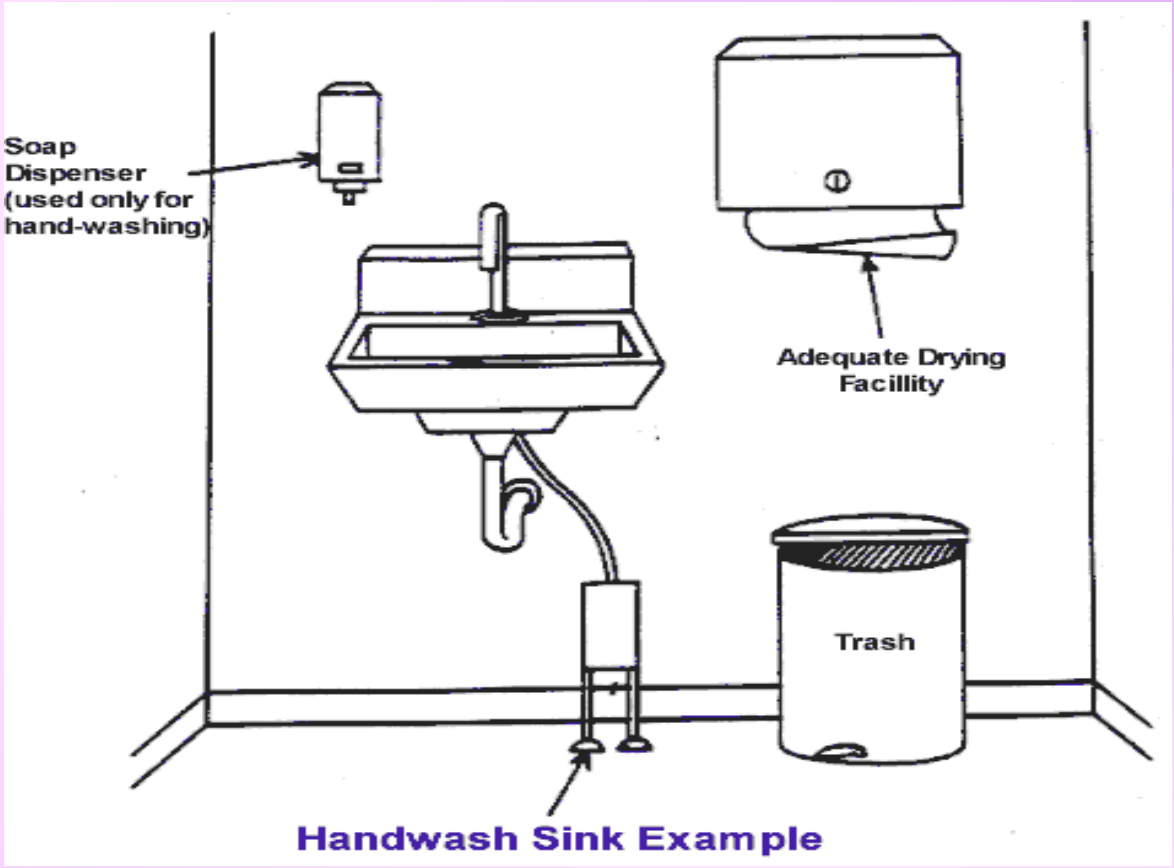
4.1 Water , ice and steam

- In case of reused water , reused water has to be treated properly to assure the microbiological quality and to prevent re-contamination to incoming product.
- In washing particularly produce, an appropriate changing water from time-to-time to prevent the growth of microorganism
- Records of all use water for washing .
- Prevent any cross contamination between potable and non-potable water lines .
- Colored pipe line may be needed

4. Saniation Facilities

4.2 Toilet facilities

- Wash hand basics
- Locate at appropriate stations
- Need liquid soup with hand sanitizer
- Need dry hard equipments or towel
- Avoid hand doorknob
- Avoid hand faucet



- Liquids soap
- Dry hand blower
- Hand wash without facets
- trash bins
- warm water

Liquid soap dispensers

Hand dry facility

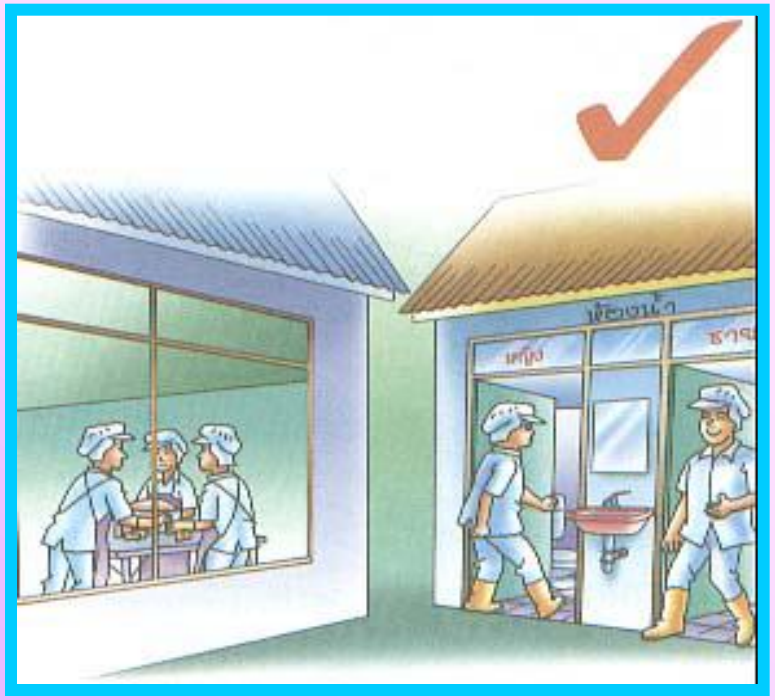
Hand dip

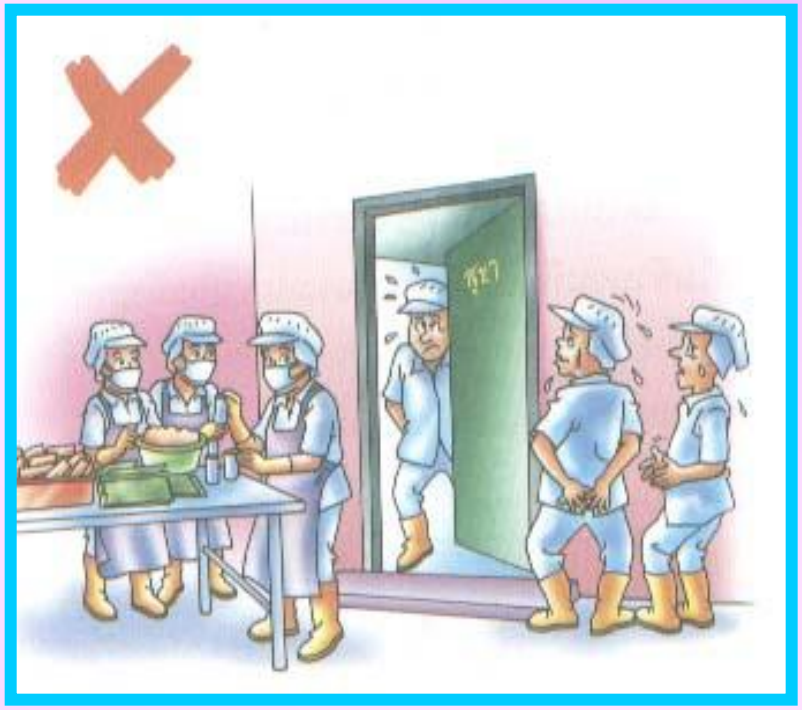
Without hand touch

- **Toilet facilities**

-Adequate, clean and maintain in hygienic condition.

-Separate from processing area.





Number of Toilets Facilities and Wash Hand Basins

Per heads	Women Toilets	Men Toilets	Wash hand basins
•15 or less	1	1	1
•more than 15	2	2	2
•more than 40	3	3	3
•more than 80	Extra 1 room/per 50 persons	Extra 1 room/per 50 persons	Extra 1 room/per 50 persons

4.3 Pest control

A pest is an animal which lives in or on food

–Rats

–Mice

–Insects
  cockroaches, flies, ants

–Stored product pests
  beetles, weevils, flour moths

–Reptiles
  lizards

–Birds

–Animals attached by pests
  cats and dogs

Pest can pose hazards in relations to:

- **Biological -**
  carriers of serious virus and bacterial con tamination.
- **Physical -**
  contamination by body parts, hair, urine, droppings, and eggs.
- **Cost of wastage.**

Pests require

Security
Shelter
Food and water

- There are two factors for prevention

1. Denial of access-proofing, screening of windows, curtains on doors and sealing of holes
2. Denial of food and shelter-good hygiene and cleanliness

Factory kept clean

- Effective waste control
- Food in preparation kept covered
- Clean spillages quickly and effectively
- No food left outside the facility
- Food stored off the floor and away from walls
- External shelter denied
- Raw materials checked upon intake and during storage
- Food stored in pest proof containers
- Drains kept clean and screened

The Control of Pests

- *Physical Control–*
  electric fly killers, rodent traps, sticky fly strips, curtains, bird screens and pheromone traps
- *Chemical–*
  rodenticides, insecticides, and fumigates

- Understand your raw materials and likely associated pests
- Inspect incoming raw materials on intake
- If there is a serious problem with infestation take professional advice,inspect the facility regularly and record these inspections
- Work with staff to make sure they understand the need for hygiene and cleanliness

4.4 Waste Management

- Designate a specific secure, confined area outside the processing facility for the temporary holding of trash and produce waste.
- Trash and waste collection center should be constructed to facilitate cleaning and to avoid accumulation of residue and bad odors.
- This area must be well outside the production perimeter.
- Use closed containers and need to consider dominant winds to avoid bad odors in the production and packing facilities and the surrounding neighborhood.

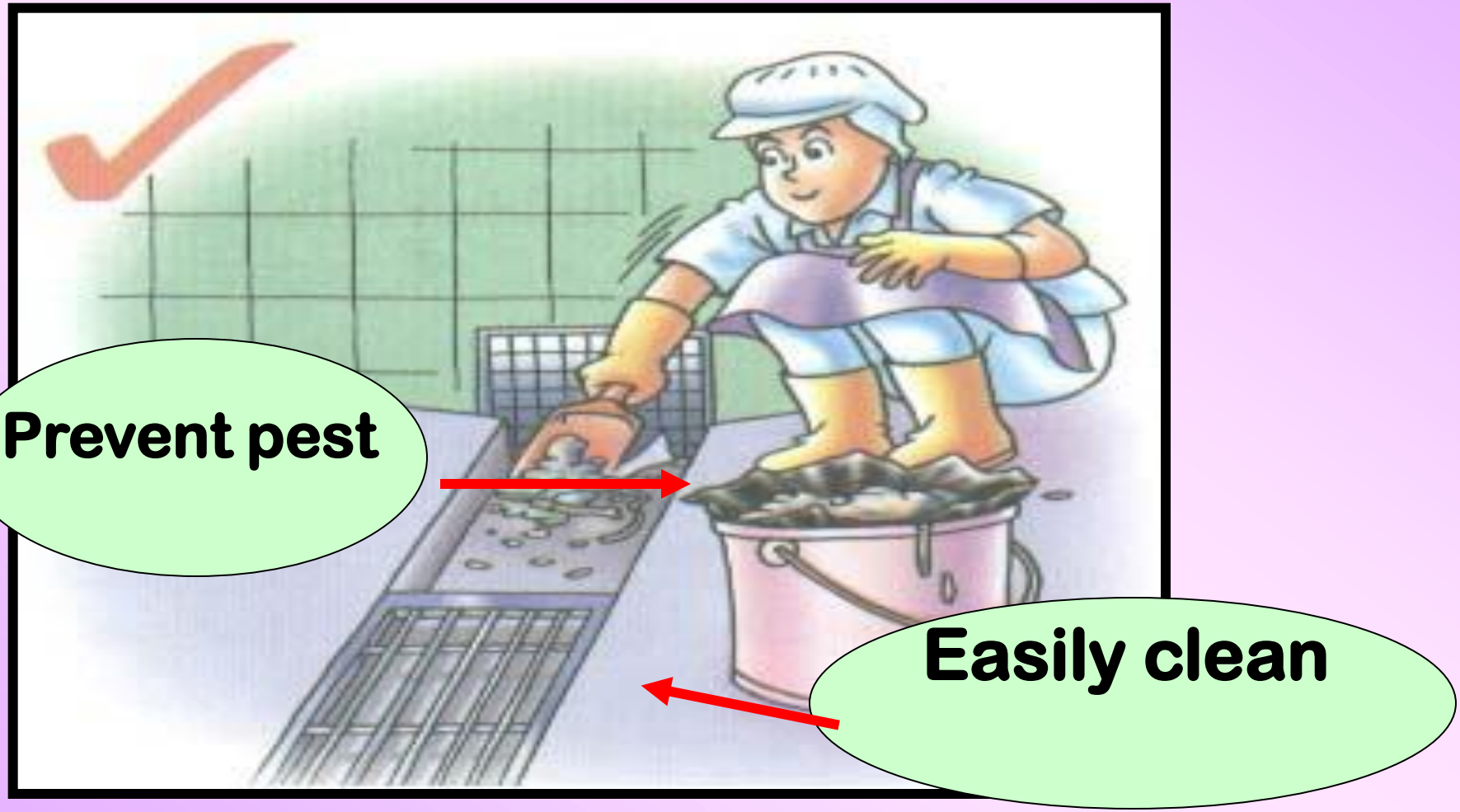
Good Manufacturing Practices related to trash and waste handling:

- **Trash containers and waste baskets used inside the production and packing areas must be conveniently located and properly identified.**
- **Trash containers and waste baskets should be able to be tightly closed, and not easily overturned.**
- **Trash and waste material should be removed often and schedule for the daily cleaning activities.**
- **Separation of organic and inorganic waste material with appropriate recycling is recommended.**

Separate waste

- **Tightly closed, and not easily overturned.**

4.5 Drainage



5. Maintenance and cleaning

- Keep contact surfaces clean and free of contamination from tools, cords, cleaning utensils, machine parts, lubricants and paper.
- Clean all spills as well as wipe or mop up spilled liquids promptly .
- Keep everything off the floor and the area clean and floors swept.
- Work areas should be cleaned regularly throughout the shift.
- Scrape the floor around the work after completing a jop.
- Always leave work area clean at the end of each shift.

Separate Chemicals from Food Ingredient

Clear Labeling All Chemicals

6. Personal hygiene

- All employees working in direct contact with food , food contact surfaces and food packing must conform to hygienic practices

Any unhygienic practices is not allowed in food handling areas

Diseases transmission through food

- Examples of microbial pathogens that are common only transmitted by infected food workers:
- *Norovirus, Hepatitis A, Shigella spp, Enterohemorrhagic E. coli, Salmonella Typhi*
- People known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through food, should not be allowed to enter any food handling area if there is a likelihood of their contaminating food.
- Any person so affected should immediately report illness or symptoms of illness to the management.

- A person who has diarrhea or is a carrier of a communicable disease that can be transmitted is prohibited from working with food.
- That person must be excluded from working in receivin g, inspection, washing, or other processing areas.
- Cuts and open skin lesions can be a source of pathogens and must be treated appropriately
- Wash the affected area
- Apply a bandage, and then cover with a barrier (e.g. glove)

- Ensure that a clean bandage covers any open wounds

- Inform supervisor if feel ill with symptoms that could contaminate ingredients or products

Clothing

-Wear pants and covered sleeves
-Separate shoes
- No open toes and high heels, are to be worn in the factory
- Personal belonging and street clothing must be stored in locker rooms
- Covered mask and hat properly

Hair net and hat cover

Ears cover

Hairs cover

All employees must wash their hand thoroughly

Handwashing Should Take Place

- When they enter food handling areas
- Before starting work•
- After any absence from a work station
- After handling contaminated materials
- After breaks
- After using toilet facility
- After blowing nose or touching face or hair
- After performing maintenance on equipment
- After picking up objects from the floor

•Every Time after Changing Activities

- No perfume, fragrant cream or any jewelry or nail polish.
- Fingernails should be trimmed short.

- Disposable gloves must be used correctly to ensure handling hygiene and safety
-Gloves must NOT be used in place of proper hand washing
- Wash hands thoroughly before and after wearing gloves

No eating or testing any food during operation

keep hand out from scratch or
touch any of body parts during handling food,
washed hand after touching

No eating, drinking , smoking
or chewing gum

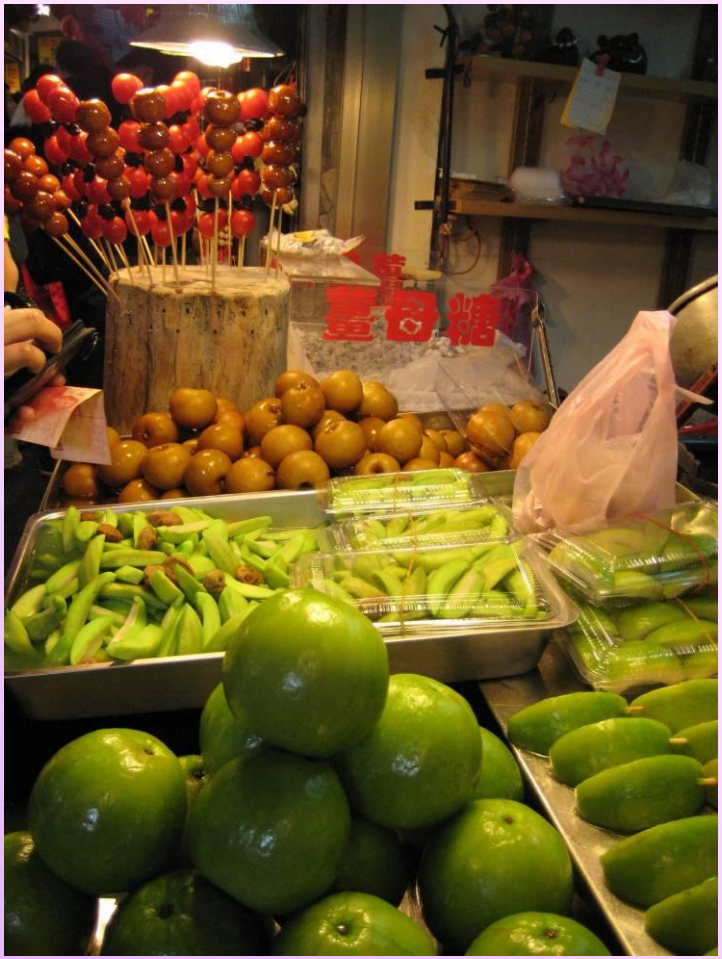
Training

- Careless employee practices can cause product contamination
- The best way to avoid contamination is to prevent it
- *Training and education is the way to prevent*
- Regularly fresh up best practices and the standard operation procedure (SOP) and sanitation standard procedure (SSOP) through training

Visitors

- Visitors to food manufacturing, processing or handling areas should, wear protective clothing adhere to the other personal hygiene provisions in this section.

Prerequisite programs



Definition:

procedures, including SOPs and SSOPs, that address operational conditions providing the foundation for the HACCP system

- **SOPs** define as standard operating procedure which are the specific steps to perform a task
- **SSOPs** address sanitation operational operation which are the specific steps to perform a sanitation task
- both are pre-requisite program providing the foundation for the HACCP system

SOPs and SSOPs

- Describe the plant's sanitation and operation program
- Uniform communication of plan
- Use as standards and monitoring procedures for evaluation
- Living document and open to change and improve "dynamic document"

Eight Key Sanitation Conditions and Practices

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 condition
8. Exclusion of pests

Reference

U.S. Dept. of Health and Human Services, FDA . Center for Food and Applied Nutrition (CFSAN) 1998. *Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruit and Vegetables*. Oct. 1998. http://www.fda.gov.

FDA. Analysis and Evaluation of Preventive Control Measures for the Control and Reduction/Elimination of Microbial Hazards on Fresh and Fresh-cut Produce. *Chapter IV and Chapter V.* http://www.fda.gov.

Rangrajan A. *et al. Food Safety Begins on the Farm. A Grower's Guide.* Good Agricultural Practices for Fresh Fruits and Vegetables.

มหาวิทยาลัยเกษตรศาสตร์ เฉลิมฉลองสถาปนาครบรอบ 72 ปี ในปี พ.ศ. 2558

THANK YOU