MINISTRY OF AGRICULTURE

PLANT QUARANTINE/ PRODUCE INSPECTION BRANCH
HOPE GARDENS,
KINGSTON 6, JAMAICA

Packaging Facility Guidelines and Standards

STRUCTURAL REQUIREMENTS

Packing house must be strong enough to withstand the elements of nature. The structural frame of the packing house must be established using material that will facilitate proper washing, disinfecting and other means of sanitation.

Space

- Minimum operational floor space requirement is one thousand (1,000) square feet
- Building must conform to local building regulations
- A portion of the 1,000 square feet could be used for storage; sawdust or coir dust storage. However, independent storage facility could be established outside the packing house structure.

This 1000 square feet area does not include space for office, sanitary convenience, storeroom, lunch room etc.

Building structure

- Must be separate building from dwelling house in accordance with the Public Health standards.
- Must be of sound structure established for fresh produce processing; the structure could be established using the following models:
    - *Constructed using concrete or suitable material (board not recommended for the main structure such as sides and floors). See figure one.*
- The layout should be designed to allow for loading, off-loading, packing and dispatch of produce.

Figure1 Model Packing House Built Using Concrete

Floor

- Concrete flooring for safe and easy movement of people and produce.
- Floor must be steel floated to allow free flow of water and washing after packing.
- Floor must be sloped towards drain.
  It is recommended that where the floor meets the wall it should be curved with no right angles (semi-circle/curves to prevent water settling and easy cleaning).

Figure 2 Smooth Steel Floated Floor Surface

Wall surface

- Wall surface must be smooth and painted with light coloured food grade paint (fungus resistant).
- Easy to clean surface, not prone to growth of molds.

Ventilation

- Building should be constructed to facilitate adequate ventilation while providing protection.
  - ✓ At least one-third (1/3) of wall space should facilitate proper air flow.
  - ✓

Figure 3 Windows being a third (1/3) of the Wall Space to Facilitate Air Flow

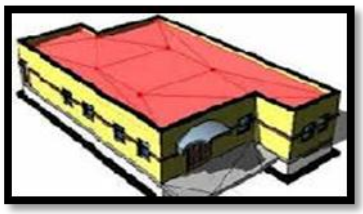
Roofing

- Building must have adequate overhead protection from the elements of nature.
- Roofing Types: Concrete slab, Aluminum or Galvanized zinc, or any other suitable roofing materials - roofing tiles, shakes, and shingles.

- Material for roofing must be clean and undamaged
- Translucent sheets could be used to enhance lighting inside packing house. However, this must only be done if ventilation is excellent. Translucent sheets may result in temperature build up in the packaging house.
- Roof eave should hang at least one (1) meter all around
- Roof must be constructed to prevent water settling
- Packing house that is built with slab roof may require additional ventilation.

Figure 4 Types of Roofs

Roof Tiles



Slab Roof

Zinc Roof

Lighting and Electricity

- Building should have electricity and adequate lighting to facilitate washing, sorting and packing. (Lighting should be 540 lux)
  - ✓ Choice of lights inside the packing house should be yellow lights; yellow lights act as a repellant for insects
  - ✓ White lights could be used away from packing house to pull insects away from operation areas.
  - ✓ Bulbs are to be covered in order to prevent contamination of produce from broken glass of broken bulbs.

Figure 5 Lighting

Uncovered Light Covered Light

Screens (protection)

- Openings should be screened to protect against entry of insects, birds, rodents and other vermin or anything likely to contaminate the produce.
  - ✓ Screen specification: insect proof screen

Figure 6 Examples of Insect Proof Screens

Window screen

Door screen

Road

- Through road access to the property; road should be relatively smooth and able to accommodate small to large trucks and cars.

Doors:

- All doors in the facility must be self-closing

Drains and Chemical Disposal

Drains

- Drainage must be designed to handle runoff as well as water used in processing operations, without posing threat to the environment.

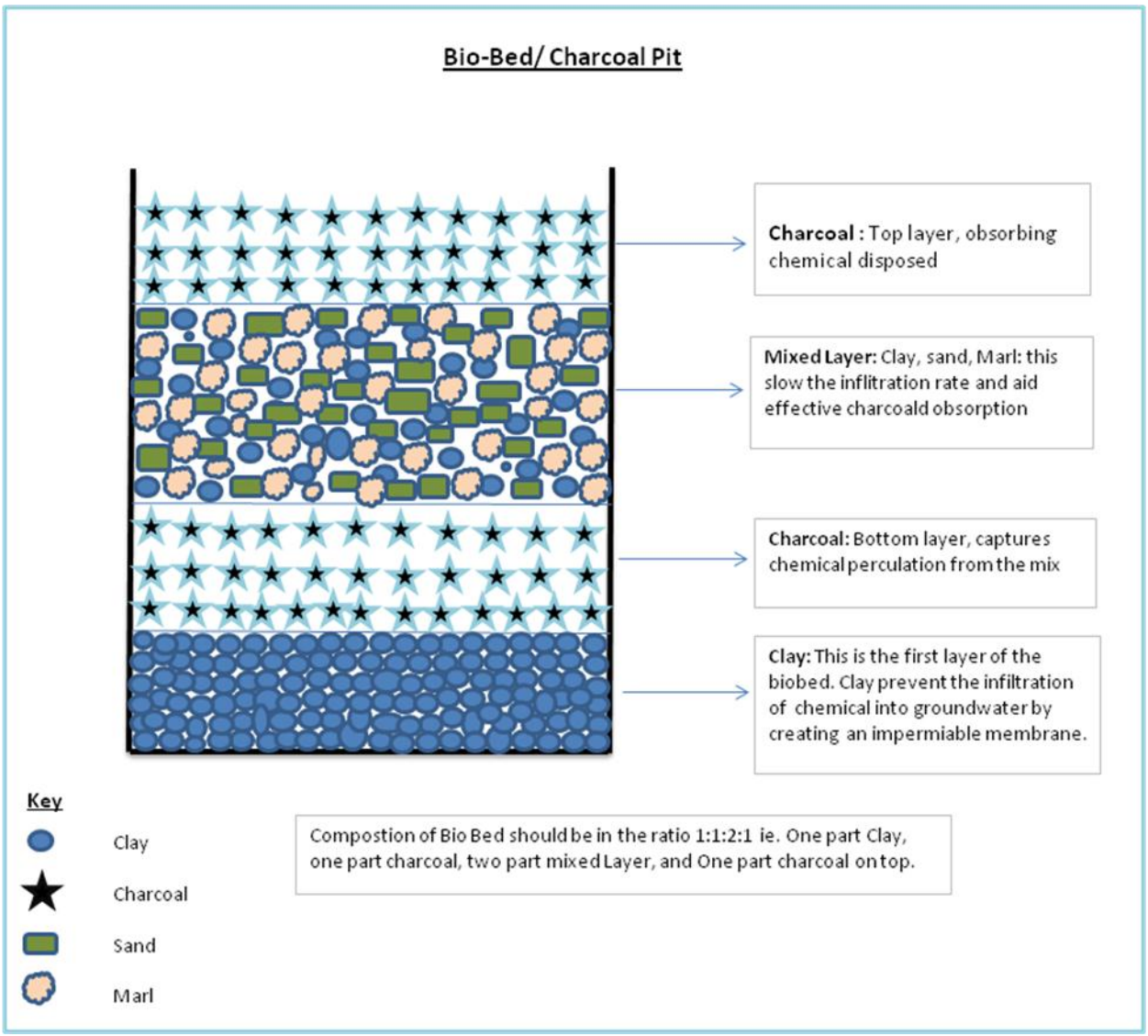
  - ✓ Drains and wastage conveyance outlets: open drain system to facilitate cleaning and inclined to allow flow of waste from the packing house (must be designed to prevent the entry of rodents).

Figure 7 Open Drain Having Suitable cove to Prevent Entry of Rodent

Charcoal pit

- Should be constructed for the disposal of unused chemical mixture. The minimum pit dimension should be three (3) feet wide and four (4) feet deep. The pit should be layered firstly with a layer of clay, then charcoal, then a mixture of sand, marl and clay (2:1:1 ratio) and topped with charcoal.

Figure 8 Cross-sectional Layout of a Charcoal Pit



OPERATION AREA: Space Lay-out/Flow

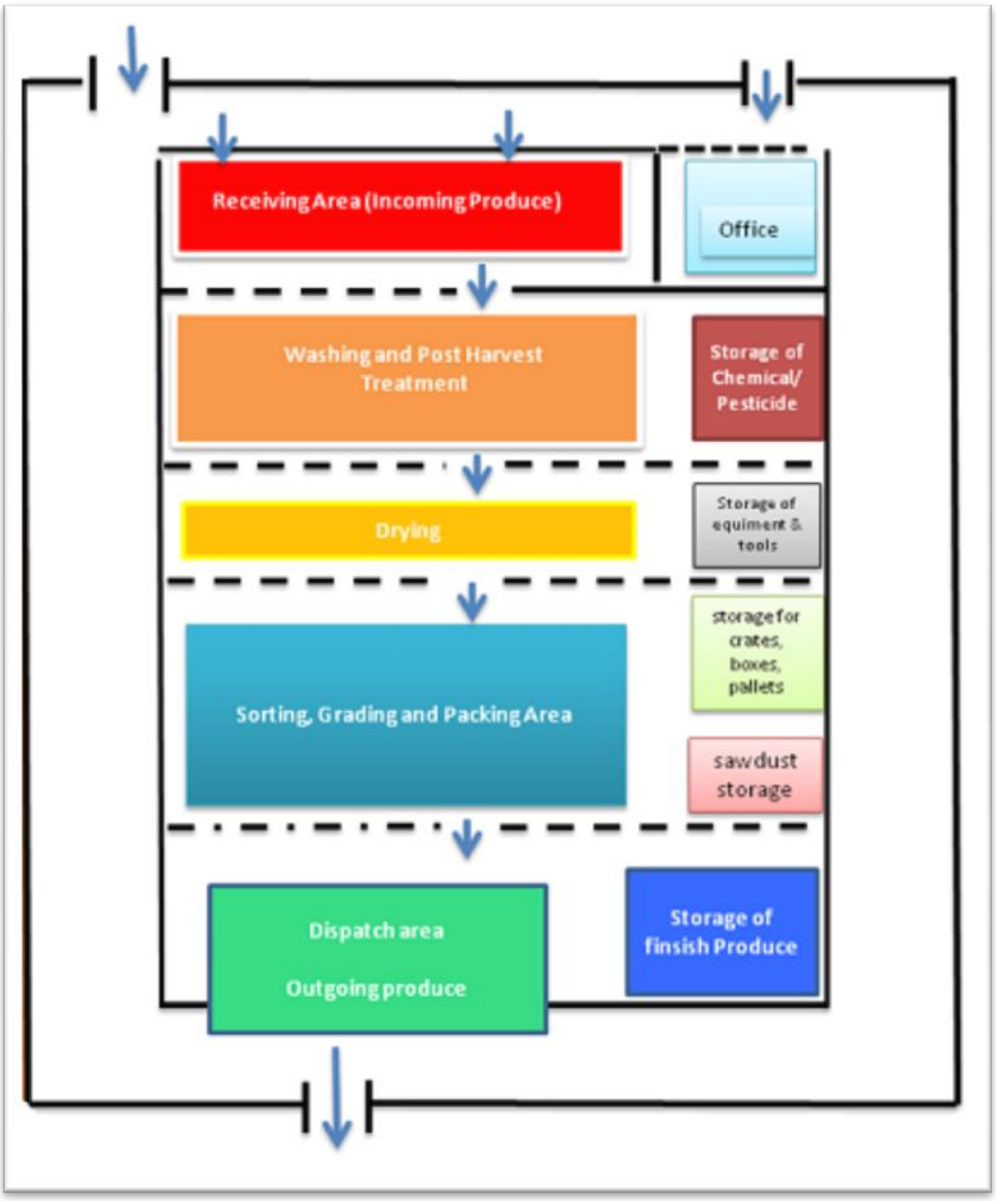
From off-loading through to finish, product should be in a unidirectional flow, with designated operational area. There should be a designated area for offloading, checking, sorting, treatment, packing, holding and dispatching.

Space lay-out / flow

- Off –loading
- Checking and Selection
- Washing / Cleaning
- Post harvest treatment
- Drying
- Grading and Sorting
- Packing
- Holding (Finished product)

- ✓ Layout should be designed to allow free movement of produce and personnel throughout the packaging house.
- ✓ Allow separate space for off-loading, checking, and recording, washing, holding, treatments, packing and dispatch areas.
  Allot adequate space for equipment, chemicals, storage of packing supplies.
- ✓ Chemicals should be stored in a separate, secured, restricted, ventilated area.

Figure 8 Unidirectional Flow Operation



Operation Area: Equipment, Tools & Materials etc

Some tools, equipment and materials necessary for an effective operational flow in a processing and packaging facility.

Washing Facilities

- Wash tank: Stainless steel, plastic (plastic must be food grade finished) and concrete (Smooth, impervious, non-absorbent, and cleanable).
- Elevated at a minimum of 75cm

Figure 10 Wash Tanks

Food Grade Plastic Wash Tank

Concrete Wash Tank

Dip Tank (plastic or concrete)

Treatment/dip tank [for post-harvest treatments]: high-density polythene supported on stands about 75 cm high. Concrete (Smooth, impervious, non-absorbent, and cleanable)

Figure 11 Dip Tank Made From Food Grade Plastic and Supported on a Metal Stand

Stools and chairs

- Seating for workers must be the sufficient to promote comfortable working conditions.

Tables or Drying Racks

- Drying rack or table made of plastic-covered wire mesh or diamond shaped wire mesh is suitable. Dimension: 4ft x 8ft
- Sorting and grading table made from stainless steel or plastic. If constructed with board, the surface must be covered with plastic coated material, e.g. linoleum (food grade)
- Table and drying rocks should be approximately 75 cm high

Trays, Bins

- Produce bins, containers or trays should be preferably made of high-density polythene.

Knives

- Stainless steel knives; well sharpened for cutting fresh produce

Pallets

- Plastic or treated wooden pallets are recommended to be used inside packing house

Produce Wash Brushes

- Must be available for washing ground produce

Cleaning Equipment and Supplies

- Must be available (broom, mop, shovel, dust mask etc.)

Scales

- Scales for weighing incoming fresh produce
- Scale for weighing finished commodity and
- Separate scale for weighing chemicals
- Scales should be calibrated and have measurements in metric (kg).

Water

- Potable running water (municipal or have proof of treatment)

Roller Conveyors

- **Optional** but recommended to facilitate better management, supported on stands are ideal for the movement of bins or trays throughout the various stages

Chemical/Pesticide Requirements

Pesticides should be stored in dry, cool conditions and be securely locked away. Pesticides must be stored separately from produce and packaging materials. Storage must be in line with Pesticide Control Authority regulation.

The appropriate chemicals should be used for the intended market. See Post Harvest Treatment guidelines.

Requirements for Chemical/Pesticide use in Post Harvest Operation

Gloves

- Rubber gloves. Must be sturdy
- 12 inches in length (from the base of the hand reaching to the elbow)

Mask and goggles (respirator)

- Use appropriate safety gears. DO NOT USE DUSK MASK

Rubber Boots and/or Hard Boots

- Must be worn within operational area

Measuring Cylinders/Cup

- Must be used to measure liquid type chemicals correctly e.g. Mertec

Scale (digital for small measurement)

- Small unit scale to measure powder based fungicide e.g. Botran

Spoon (teaspoon/tablespoon)

- Must be present and used to assist in measuring chemicals

Record books/ sheet

- Proper record system must be in place and available for viewing upon request
- Records should be made of each post harvest application
- Each application should be in compliance with the post harvest fungicidal guidelines

For recommendations on approved pesticides for selected importing countries from Rural Agricultural Development Authority (RADA) and Pesticides Control Authority (PCA) see Annex 1.

STORAGE

The operational flow chart that outlines the one way flow system will help to design designated area for storing finish produce and material in a manner that will help to prevent cross contamination.

Chemicals

- There should be suitable storage area for detergent, soap, bleach etc

- Chemicals should be stored in dry, cool conditions and kept securely. Store chemicals separately from produce and packaging materials.

Stationery and Shipment supplies

- There should be suitable storage for boxes, tape, staples**.**

Finished product

- Designated storage area for finished product (finished products must not be stored in close proximity to untreated produce; cross contamination must be avoided at all times)**.**
- A chill room is considered the most suitable areas to store finish produce.

Packaging materials

- Proper storage for pallets
- Proper storage area for sawdust, coir fiber or dust.
- If sawdust is stored on the outside, a proper structure with a suitable roof that would prevent contamination from external factors (rain, dust, pathogens) should be constructed to facilitate covering and locking. This structure should be elevated at least 2ft from the ground.

Figure 12 Uncovered Sawdust Bins

Personnel Requirements

Protective gear

- Aprons, hair cover, hard boots should be worn at all times within the operational area in keeping with food safety standards.
- Protective gloves must be worn by personnel handling food

Personnel Facilities:

Bathroom **-** Located away from operational area (must be properly maintained). Ratio of personnel to bathroom must be in accordance with Public Health Standards.

Hand wash station and Eye Wash Area **-** Provide adequate hand washing facility with soap, hand sanitizer, disposable towels, and/or hand dryer

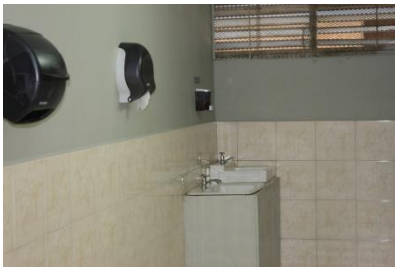


Figure 13 Typical Hand Wash Facility

Running water - Potable running water (municipal or proof of treatment for other sources)

Lunch Room - Specific area for eating and relaxing

Changing Room - Located away from the operational area with appropriate lockers for workers

Sick Bay - Must be in place

First Aid Kit

- Must be in place
- Must have basic items (disinfectant, bandages, pain killers, activated charcoal (treatment for poisoning), and smelling salt, rubbing alcohol.

Office

- Must be in place
- Telephone, documentation processing, record storage etc.
- Provide records for reviewing upon request e.g. The Produce Book
- Provide information on Traceability program, e.g. chemical usage

SANITATION

All packing houses must maintain proper operational hygiene in compliance with local and international standards**.**

Grounds

- Proper outdoor sanitation should be maintained. Shrubs, brushes and grass should be pruned.
- Animals are not allowed. There should be no rearing of goats, cows, pigs or other such animals on the same compound.
- If dogs are used for security purposes, they must be secured during working hours in proper kennels.
- Covered bins, containers, garbage disposal skips must be in place and conveniently located.

Foot Bath

- Located at the entrance of the packing house. Foot bath is recommended to help eliminate harmful pathogens from entering packing house.

- Foot bath should made of plastic, stainless steel or concrete supported with a sponge based material filled with iodine solution

ANNEX 1 Recommended Post Harvest Chemical

United State of America and Canada

Fungicide	**BOTRAN 75WP** (a.i.*dicloran*)

Volume of tank used for post-harvest treatment	**Mild 200 ppm**	**Medium 400 ppm**	**Strong 600 ppm**
1 gallon (4.55 L)	1.2 **Grams (g)**	2.4 **Grams (g)**	3.6 **Grams (g)**

USA standard for Botran (Dicloran) tolerance is **10 ppm or 10mg/l.** Thus the propose measurement falls in line with the FDA tolerance level**.**

EU Markets

Fungicide	**Mertec** (a.i. *thiabemdazole)*

Volume of tank used for post-harvest treatment	**Mild 200 ppm**	**Medium 400 ppm**	**Strong 600 ppm**
1 gallon (4.55 L)	4.0 **(ml)**	8.0 **(ml)**	12.0 **(ml)**