



# Spice and Herbs Processing Level-II

Based on May 2011, Version 2

Occupational standards

**Module Title:** Receiving and Handling of Spice and  
Herbs in a Storage Area

LG Code: IND SHP2 M7 LO (1-5) LG (22-26)

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LG #22	LO #1- Receive and process
Instruction sheet	
<p>This learning guide is developed to provide you the necessary incoming goods information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"><li>• Maintaining cleanliness and orderliness in receiving bay</li><li>• Conducting Work</li><li>• Unpacking goods using correct techniques and equipment</li><li>• Removing and disposing Packing materials</li><li>• Checking and validating incoming stock</li><li>• Inspecting receive Items</li><li>• Recording stock levels</li><li>• Arranging secure storage of stock</li><li>• Dispatching stock</li><li>• Applying stock price and code labels</li></ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"><li>• Maintain cleanliness and orderliness in receiving bay</li><li>• Conduct work</li><li>• Unpack goods using correct techniques and equipment</li><li>• Remove and disposing Packing materials</li><li>• Check and validating incoming stock</li><li>• Inspect receive Items</li><li>• Record stock levels</li><li>• Arrange secure storage of stock</li><li>• Dispatch stock</li><li>• Apply stock price and code labels</li></ul>	



### Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If you earned a satisfactory evaluation proceed to “Operation sheets
6. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
7. If your performance is satisfactory proceed to the next learning guide,
8. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets” .



## Information sheet 1: Maintaining Cleanliness and orderliness receiving area of goods

### 2.1. Maintaining Cleanliness

**Cleanliness.** This is a measure of the amount of foreign and extraneous matter, for example insect contamination, excreta or foreign bodies. Measurement is by physical determination. There are a number of reasons behind cleanliness of bay.

- Boxes, cartons, packing materials, and other obstructions are trip hazards.
- Keeping the stock / inventory receiving area clean helps prevent goods becoming soiled (dirty) and stops staff becoming dirty.
- A tidy receiving area means that when goods are delivered they can be easily identified, mistakes will be minimized and checking the deliveries is made easier.
- Shelving should be kept tidy so that goods can be placed directly on them.
- If accidents occur, spills should be cleaned up straight away so that staff do not slip on them or walk the liquid into other parts of the store.
- Equipment such as pallet jacks and trolleys should be stored safely when not in use.

### 2.2 Orderliness of goods

- Assess Shelf and Space Utilization.
- Reduce the amount of shipping containers.
- Focus on creating a clean, accurate warehouse/storage.
- Use information labels on all products.
- Implement a labeling system.
- Keep your warehouse clean
- Adopt technology.



Self-Check – 1

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. What is cleanliness? (1)
2. Why reasons behind cleanliness of raw materials?(2)
3. Why we order raw materials?(1)

**Note:** Satisfactory rating - 4 points      Unsatisfactory - below 4 points

You can ask you teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_





## Information Sheet 2: Conducting Work in accordance with workplace Environmental guidelines

### 2.1 Workplace environmental guidelines

All work is carried out according to company policies and procedures, regulatory and licensing requirements, legislative requirements, and industrial awards and agreements. A well-equipped, laboratory for testing of food materials/food for physical, microbiological and chemical analysis in accordance with the specification/standards laid down under the rules and regulations should be in place inside the premise for regular/periodic testing and whenever required.

If there is no in house laboratory facility, then regular testing shall be done through an accredited lab notified by FSSAI (Food Safety and Standards Authority of India).

Food processing operations flow diagram and standard operating procedures shall be documented, implemented and should be displayed at operations site. Good manufacturing practice (GMP) is that part of quality assurance which ensures that products are consistently produced and controlled to the quality standards appropriate to their intended use and as required by the marketing authorization.

#### Ten Principles of GMP

1. Design and construct the facilities and equipment's properly
2. Follow written procedures and Instructions
3. Document work
4. Validate work
5. Monitor facilities and equipment
6. Write step by step operating procedures and work on instructions
7. Design ,develop and demonstrate job competence
8. Protect against contamination
9. Control components and product related processes
10. Conduct planned and periodic audits



Self-Check – 2

Written test

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below

**Short Answer Questions**

1. Define Good manufacturing practice? (2)
2. Write principles of GMP(3)

**Note: Satisfactory rating - 5 points**

**Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



### Information Sheet: 3 Unpacking goods using correct techniques and equipment

Unpacking is the process of emptying the contents of a shipping container. The systems used to unpack containers may include the manual handling of goods. This can involve heavy lifting, using awkward postures and spending long periods of time doing the same movements.

Special tools or equipment are needed to remove or unpack goods has different techniques and equipment such as scissors, pliers and screwdrivers, for example and use a crane or forklift with attachments such as grabs, spikes or slippers ,use a tag line to guide loads being lifted using a crane.

If manual unpacking is necessary you should:

- Train workers in the safest system of work to unload the container
- Ensure goods are handled between the knee and shoulder height by using pallet jacks, pallet rollers, trolleys or adjustable conveyers.
- Using personal protecting equipment (PPE) such as gloves, hard hats, safety glasses, and visibility clothing.
- Ask for help if you don't have the equipment or expertise to safely unpack a container. If necessary engage specialists to do the unpacking.
- Checking for any notices or labels (such as dangerous goods labels), or notices concerning the contents.



Self-Check – 3

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. Define term unpacking? (1)
2. How to unpack spices and herbs ?(1)
3. List the equipment using for unpacking equipment(1)

*Note:* Satisfactory rating - 3 points      Unsatisfactory - below 3 points

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_

## Information Sheet 4 Removing and disposing Packing materials

### 4.1. Removing and disposing Packing materials

Disposal of sewage & effluents (solid, liquid & gas) shall be done as per the Ethiopia Environment Protection proclamation no.513/2007 on Solid waste management. The wastes generated from the stock treated using 3-R which means recycle, Reuse and reduce.

- **Reduce** means that manage waste is to not produced it.
- **Reuse** means reuse products for the same use and for another process as input.
- **Recycle** means remanufacture the products or materials and sell it as a new product.

Accumulation of waste shall not be allowed in food-handling or storage areas. Removal frequencies shall be managed to avoid accumulations, with a minimum daily removal. The disposal of the waste shall be done in such a way that it should not cause any hazard to the environment. Waste storage facilities shall be:

- removed from the processing areas
- Collected in identifiable containers with be lid.
- Designed to prevent access to waste by pests.
- Waste containers shall be kept in designated area.
- It can be readily cleaned and sanitized.
- Foot operated bins are recommended.
- Segregate waste into reduce, recycle and reuse



Figure 4.1. 3R



Self-Check – 4

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. What is 3R? (1)
2. What are criteria to consider when disposing waste ?(2)

**Note: Satisfactory rating - 3 points**

**Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



## Information Sheet 5: Checking and validating incoming stock

### 5.1 Checking and validating stock

Check all purchases/deliveries to confirm that the quality is acceptable and that spices and herbs are within the durability date. Incoming materials checking is critical to prevent adulterated or contaminated materials from entering a food processing industry. Always check the durability date before using the selected stock. Carry out a periodic stock check, the frequency of which will depend on the type and normal durability of the stock carried

In addition, the price of products delivered is verified at the time they are received and any variations in price are noted in writing. If the goods are damaged, a damage report is prepared. Then finally accept or reject food based on receiving criteria of the company. During receiving goods the following criteria of products are analyzed before entering in to storage place.

- Correct item
- Specified quantity
- Quality
- Food safety criteria
- discrepancies,
- Pest and out of specification.



## S. No   **Spices   Adulteration   Type of Adulterants in Spices**

1.	Mustard	Addition of Argemone seed
2.	Black pepper (whole & powder)	Mixing of Papaya seeds, light berries and may even add filler such as sawdust.
3.	Spices ground	Added starch, Powdered bran and sawdust.
4.	Turmeric powder	Coloured saw dust, Lead chromate, Metanil Yellow, Chalk powder or yellow soapstone powder.
5.	Chillies powder	Brick powder, salt powder or talc, powder, Artificial colors and dyes, Water soluble coal-tar color, grit, sand, dirt, filth.
6.	Asafetida (Hing)	Soap stone or other earthy material, Starch, Foreign resin.
7.	Coriander powder	Cow dung powder, Common salt, and sawdust
8.	Oregano	addition of other similar herbs and plant leaves
9.	Cumin (whole & powder)	Cumin seeds are mixed with Grass seeds coloured with charcoal dust, powder can be mixed with sawdust
10.	Saffron	Can be made of coloured gelatine strands or stretched with dyed maize filaments (corn silk)
11.	Cinnamon	With cassia
12.	Cloves	Can be mixed with exhausted cloves

**Table 5.1 Type of Adulterants in Spices**





Self-Check – 5	Written test
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Name..... ID..... Date.....

**Directions: Answer all the questions listed below**

**Choose Answer Questions**

1. During receiving goods the following is not criteria (3)
  - a) Received Incorrect item
  - b) Specified quantity
  - c) Quality
  - d) Food safety criteria
2. The purpose of proper receiving incoming raw materials are to ensure products quality(3).
  - a) false
  - b) true
3. Which of the following not type of Adulterants in Spices(2)
  - a) Mixing of Papaya seeds
  - b) Common salt
  - c) Turmeric powder
  - d) sawdust

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

*Note:* Satisfactory rating - 8 points Unsatisfactory - below 8 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_



## Information Sheet 6: Inspecting received Items

Raw material inspection is to select raw materials or spices and herbs for a manufacturing or processing at factory at first stage. A receiving procedure is needed to properly inspect all incoming goods, mark them with tags, and record them as having been received. Always check the durability date before using the selected stock. If out-of-date, report the fact to the supervisor or discard.

Processing involves unpacking the goods, checking and validating them, and then dispatching them to the right area or department. Items likely requiring review are the quantity received, comparison to a quality threshold, and the date and time of receipt. Check the goods labeled that includes the item number, quantity, and unit of measure.

A tidy receiving area means that when goods are delivered they can be easily identified, mistakes will be minimized and checking the deliveries is made easier.



Self-Check – 6	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below

**Choose the correct Answer**

1. \_\_\_\_\_to select raw materials or spices and herbs for a manufacturing or processing at factory at first stage? (2)
  - a) Validating stock
  - b) Raw material inspection
  - c) Receiving raw material
2. One of the following is not true (2)
  - a) Reject unacceptable goods
  - b) Accept quality goods
  - c) Received expired raw material
  - d) Received correct quantity

**Note: Satisfactory rating - 4 points  
points**

**Unsatisfactory - below 4**

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



## Information Sheet 7: Recording stock levels

Accurate record keeping depends on easy to use, well-designed methods and forms. Reliable record keeping is very important, because errors caused by poor record keeping will affect service delivery. For example, if stock records used to estimate requirements are not accurate, you may order too much or too little. Stock cards (stock record cards) and stock control ledgers are the simplest. Ensure that staff carrying out the checks knows what they are looking for and understand best before and use-by dates. They provide information about;-

- quantities received, issued and in stock at any time,
- can be used to calculate orders,
- a useful tool for preventing shortages and over-stocking.
- Stock cards help supervisors to monitor overall consumption and use by different services, and to check stock levels,
- Assess wastage and identify theft.

### **There are three basic Stock levels.**

Maximum stock level: - This is the upper level beyond which items must not be stocked. This level is decided after considering consumption frequency, durability of items and availability.

Minimum stock level: - it is the level of stock to be maintained at all times so that production and sales do not get obstructed due to want of material and ingredients.

Recorded level of stock: - between the maximum and minimum level a point is set as the recorded level, at this point the orders for fresh supplies must be placed with suppliers. To ensure that the stock of ingredients arrive before the existing stock level fall below the minimum level.



Self-Check – 7	Written test
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Name..... ID..... Date.....

**Directions: Answer all the questions listed below**

**Short Answer Questions**

1. Write stock levels? (2)
2. Why stock recorded? (2)

**Note: Satisfactory rating - 4 points      Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

3. \_\_\_\_\_

4. \_\_\_\_\_



## Information Sheet 8: Arranging secure storage of stock

### 8.1. Arrangement of storage

Adequate security arrangements are of utmost importance. Proper strong locks to be used to lock the storeroom once. It is closed Keys of the storeroom are issued to individuals designated by the chief accountant after entering into a Key Log Book .To secure storage of stock, unauthorized personnel are not allowed enter in storage.

The **‘first in first out’** principle of stock rotation should always be applied. New stock should be stored behind old stock, or underneath it. Temperature and humidity must be maintained for enhancing the shelf-life of the respective food materials/products. Storage of raw materials, ingredients, work-in-progress and processed food products shall be subject to FIFO (First in, First out), FEFO (First Expire, First out) as applicable. Use of non-toxic materials for storage of raw materials, work in progress and finished/ready to serve products. Spices and herbs should be kept off the floor and away from walls, with adequate space between stock to enable regular inspection for pests and aid cleaning. Spices and herbs should be kept apart during storage and display. Storage of stock should be:-

- Clean and free from microorganism infestation
- Tidy the area
- Ensure security arrangements are in place
- Ensure safety items ready
- Apply principle of stock rotation (FIFO)



Self-Check – 8

Written test

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below

**Short Answer Questions**

1. How to arrange storage? (2)
2. What are advantage of arranging storage properly?(1)

*Note:* Satisfactory rating - 3 points      Unsatisfactory - below 3 points

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

**Answer**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_



## Information Sheet 9: dispatching stock

Dispatching stock activities under taking

- To check the availability of input materials and ensure the movement of raw materials from store to first process and then from process to process.
- To ensure the availability of all production and inspection aids.
- To obtain the requisite drawings, specifications and material lists.

The following activities of dispatching stock include

1. Double check goods to be delivered are correct in quantity, description and quality
2. Damaged goods not dispatched unless agreement from customer
3. Regularly check loaded vehicles to ensure packing is satisfactory and only the items to be delivered are in the vehicle
4. Ensure you are satisfied with the appearance of the vehicle and the driver - they create a lasting impression
5. Maintain daily goods delivered records - ensure drivers sign for goods in good order and condition.
6. All paperwork processed promptly.





Self -Check– 9

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. Write the function of dispatch stock? (1)
2. What are the activities followed to dispatching stock? (2)

**Note: Satisfactory rating - 3 points      Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

### Answer

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Score = \_\_\_\_\_

Rating: \_\_\_\_\_



## Information Sheet 10: Applying stock price and code labels

### 10.1 Applying stock price

Checking the prices charged on the invoice against the previous cost price as listed on paper-based or electronic format stock control records (such as bin cards, or individual stock item documents on the computer-based system).

This check is made so operators get immediate notification when the cost price of raw materials or incoming goods rises so they can adjust selling prices to retain the level of profit the property requires.

#### Price lists

Most suppliers will provide some form of price list to businesses.

This price list may be:

- Electronic format where prices are listed on line.
- Hard copy where the supplier provides a price list or catalogue.

### 10.2. Stock code and Labels

Control of labeling is important to ensure that the correct label is applied to each product. Use of incorrect labels could mislead the consumer and could pose a potential health hazard to segments of the population with allergies. The manufacturer should have procedures in place to ensure that the correct label is applied to the correct product. But not all goods are labelled, so your workplace will have a labelling system. Minimum Mandatory labeling of pre-packaged foods must have the following details.

- Name of the product
- Net weight
- Name and address (manufacturer, packer, distributor, importer, exporter or vendor)
- Batch number
- Best before use date



Self-Check – 10

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. What are elements of food labeling containing? (2)
2. Define labeling ?(1)
3. How to set price ?(1)

**Note:** Satisfactory rating - 4 points      Unsatisfactory - below 4 points

You can ask you teacher for the copy of the correct answers.

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_

**LG #23****LO #2- Organize the storage of stock****Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Controlling and monitoring temperature, humidity, stock rotation and integrity of packaging
- Cleaning, drying and well ventilating storage facilities
- Allocating and supervising employees, equipment and storage areas OHS requirements.
- Informing work requirements and deadlines for individuals
- Monitoring work processes
- Noting and reporting discrepancies in stocks
- Storing all materials and products
- Carrying out sufficient space between the material and the walls

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Control and monitor temperature, humidity, stock rotation and integrity of packaging
- Clean, dry and well ventilate storage facilities
- Allocate and supervise employees, equipment and storage areas OHS requirements.
- Inform work requirements and deadlines for individuals
- Monitor work processes
- Note and report discrepancies in stocks
- Store all materials and products
- Carry out sufficient space between the material and the walls

Read the specific objectives of this Learning Guide.

Follow the instructions described below.

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1. Accomplish the “Self-checks” which are placed following all information sheets.
2. Ask from your trainer the key to correction (key answers) or you can request your trainer



to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

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4. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
5. If your performance is satisfactory proceed to the next learning guide,
6. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.



## Information sheet: 1. Controlling and monitoring temperature, humidity, stock rotation and integrity of packaging

### 1.1. Controlling and monitoring temperature

Temperature is one of the most critical environmental factors influencing mold growth and aflatoxin production. Several studies have shown that aflatoxin can be produced at temperatures as low as 7.5°C to 10°C. Proper storage has a significant impact on the quality of the spices. Whole spices, like nutmeg, caraway seeds, whole pepper and the like can be safely stored for a number of years.

The light, humidity and temperature have the largest impact on the quality of the ground spices. When they are properly packaged and stored they can preserve their properties for up to four years, depending on the type of the spice. They can become moldy if the humidity is too high. However, at high temperatures the essential oils evaporate quicker and the spices lose their strength. The light has a negative effect on aroma and on most spices containing pigments, as those fade quicker. Store the dried herbs in airtight containers. Store transparent jars in a cool and dark place, because herbs lose their properties sooner due to the impacts of light, air and humidity.

Low-temperature storage can be very suitable for controlling the growth of *Aspergillum* however; temperature should be reduced to 5°C as quickly as possible throughout the product, especially perishable commodities. Modern practices- of storing or enclosing commodities, especially perishables in airtight plastic containers or self-sealing plastic foils before storing under refrigerated conditions may provide a potentially hazardous situation.

### 1.2. Rotate Stock

Rotating stock means moving older stock to the front of the shelf in the cost or profit centers. Using this system means that the older stock is sold or used before the new stock and there is not a buildup of out of date stock. Rotating the stock also means that the stock will always be fresh.

**FIFO (First-IN, First-OUT)** is a basic rule of product rotation that protects product quality and freshness. Rotate foods so the first products displayed (IN) are the first products sold (OUT) to

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minimize spoilage and waste. Every product has a code date. Do NOT use products past their code or “use-by” dates.

**The last in, first out (LIFO)** method assumes the reverse of the FIFO method: The products most recently purchased are used first. The value of inventory is represented by the unit cost of items in inventory the longest.

**Just In Time (JIT)** - this aims to reduce costs by cutting stock to a minimum. Items are delivered when they are needed for immediate use. This means that less storage is needed however there is a risk of running out of stock, so you need to be confident that your suppliers can deliver on demand.



Self-Check – 1	Written test
----------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Fill the blank space**

1. \_\_\_\_\_ is one of the most critical environmental factors influencing mold growth and aflatoxin production(2)
2. \_\_\_\_\_ is a basic rule of product rotation that protects product quality and freshness (1)
3. \_\_\_\_\_ means moving older stock to the front of the shelf in the cost or profit centers(1)
4. \_\_\_\_\_ reduce costs by cutting stock to a minimum(1)

*Note:* Satisfactory rating – 4 points      Unsatisfactory - below 4points

You can ask you teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_

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## 2.1. Cleaning of storage

Storage of materials should be secure, neat, and orderly to eliminate hazards and conserve space. Clean storage areas thoroughly before storing produce. Practice good hygiene and sanitation. Clean and regularly maintain produce handling facilities and equipment (floors, walls, storage areas, pallets, containers, etc.). Clean and disinfect waste disposal areas. Walls, floor and ceiling should be constructed so that they can be kept clean and good repair. Record cleaning procedures, including the dates when these were actually done.

Spices and dried aromatic herbs should be cleaned properly (e.g. culled and sorted) to remove physical hazards (such as the presence of animal and plant debris, metal and other foreign material) through manual sorting or the use of detectors, such as metal detectors. Raw materials should be trimmed to remove any damaged, rotten or moldy material. Debris from culling and sorting should be periodically collected and stored away from the drying, processing and packaging areas to avoid cross-contamination.

## 2.2. Drying

To prevent the growth of microorganisms, especially mycotoxin producing molds, a safe moisture level should be achieved as rapidly as possible. Mechanical drying methods should be used instead of natural (open) air drying, where possible, to limit exposure of spices and dried aromatic herbs to environmental contaminants and to prevent growth of moulds. If hot air drying is used, the air should be free of contaminants and precautions should be made to prevent combustion gases from contacting the plant material or stored plant material in the area.

## 2.3. Ventilating storage facilities

Ventilation system natural and/or mechanical including air filters, exhaust fans, wherever required, shall be designed and constructed so that air does not flow from contaminated areas to clean areas. Filters (e.g. filters for intake air and compressed air) are cleaned or replaced at least as often as the manufacturer specifies, or more frequently if a problem is indicated, such as evidence of filter fouling or perforation. Air used as a processing technique (e.g. air agitation, air blowers, air dryers, etc. The quality of air shall be ensured through regular



monitoring and records shall be available. Spices are susceptible to mould contamination and/or growth if storage conditions are not appropriate. Storage areas should:-

- Be dry and well ventilated.
- Protection from entry of rodents and birds, and minimum temperature fluctuations.
- Separate area shall be defined to keep non-conforming materials.
- A separate, secure
- cleaned and disinfected with appropriate substance
- Well-vented structures that provide protection from rain, drainage of surface water.
- Calibrated electronic sensors may be used to monitor temperature and humidity.
- Proper ventilation
- Stack produce on pallets to facilitate ventilation, minimize damage, as well as avoid contamination.



Self-Check – 2	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below

### Short Answer Questions

1. What is ventilation (2)
2. Why dry storage facility? (2)

*Note:* Satisfactory rating – 4 points      Unsatisfactory - below 4points  
You can ask you teacher for the copy of the correct answers

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



### Information sheet 3: Allocating and Supervising employees, equipment and storage areas

Allocating tasks to skilled and experienced workers, achievement of targets and maintaining the timeliness of operations to organize the storage of stock requires that the correct number of workers is allocated to each task. Supervisors are responsible for correcting unsafe acts, such as a breach of rules, and they must be supported in this duty.

Develop workplace health and safety programs, prepare plans of action to prevent accidents and conduct investigations to stay compliant and to stay safe. Equip employees who work on stored spices in silos, or tanks, with lifelines and safety belts.

The role of Supervisor at equipment and storage areas

- Checking all equipment safe and work appropriately
- Follow up work procedures.
- Check whether if all employees wear personal protective equipment (PPE) or no
- Take corrective action immediately if any injury or illness, unsafe acts and unsafe conditions.



Self-Check – 3	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

### Short Answer Questions

1. How to allocate tasks ?(2)
2. What t you supervising in the spices and herb's storage? ?(3)

**Note: Satisfactory rating - 5 points      Unsatisfactory - below 5 points**  
You can ask you teacher for the copy of the correct answers

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



#### Information sheet: 4. Inform work requirements and deadlines for individuals

Deadlines make clear what you're expected to deliver and when. This means that you can take control of our work, free of confusions. A Supervisor inform work requirement for employee based on job description. In this module inform task for individuals to the how to organize the storage of stock and set the deadline for each task when he/he will be complete. To accomplish the given task the Supervisor and worker should be:

1. Plan
2. Priorities tasks.
3. Know your deadlines.
4. Allow enough time.
5. Find out what your employees' personal goals
6. Make a public announcement about the deadline.
7. Explore possible problems and be open to solutions.
8. Always monitor progress.
9. Understand the requirements.
10. Don't be afraid to ask questions.
11. Remove any distractions.
12. Ask for help.



Self-Check –4

Written test

Name..... ID..... Date.....

**Directions: Answer all the questions listed below.**

**Part I: Short Answer Questions**

1. What is an advantage of setting deadline ?(3)
2. How to the individuals accomplish the given task?(3)

**Part II: write true or false.**

1. Asking for help is not necessary to complete work(2)
2. Setting Priorities for tasks is time waste activities?(2)

**Note: Satisfactory rating - 5 points**

**Unsatisfactory - below 5 points**

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



## Information sheet 5: Monitoring work processes

Food safety involves monitoring temperatures of storage units usually fridges and freezers. This is usually done manually by checking the temperature of food with a probe thermometer twice per day. Remote monitoring of temperatures is an alternative compliance method. Moisture content of the spices and herbs is important to consider the food is suitable before the consumption, because moisture content affects the physical, chemical aspects of food which relates with the freshness and stability for the storage of the food for a long period of time and the moisture content determine the self-life of any food.

- Monitoring storage temperature of spice and herbs
- Monitor moisture content of o spice and herbs
- Monitoring quality of incoming raw materials
- Equipment used for monitoring should also be calibrated at defined intervals.
- Temperature and humidity should be controlled and monitored.





Self-Check – 6

Written test

Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

### Short Answer Questions

1. What is monitoring?(3)
2. What are monitored in work process?(2)

**Note: Satisfactory rating - 5 points      Unsatisfactory - below 5 points**  
You can ask you teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



## Information sheet 6: Noting and reporting discrepancies in stocks

### 6.1. Noting and reporting discrepancies in stocks

An inventory discrepancy happens when the actual on-hand inventory stock is different from the item quantity recorded in an inventory system. Discrepancies are not uncommon and can have a substantially negative impact on any business operation. If a discrepancy appears, talk to staff and find out what procedure is being used. Then either accept it, or modify the procedure to reflect the store policy. The key to effective inventory control is that the manager has a full understanding of what the staffs are doing. Carry out the following tasks:

- Withhold payment on discrepant or deficient goods
- Update a supplier's performance statistics based on discrepancy reporting information.
- Modify an existing discrepancy report
- Delete a discrepancy report if it has been raised in error
- Close a discrepancy report once a supplier or forwarding agent remedies the discrepancy
- Print a discrepancy report or series of discrepancy reports, individually or in summary format.
- Shortage of material due to spoilage, evaporation, wastage in material handling, breakdown in handling and storing.

The most common reasons stock discrepancies.

- Stock loss due to damage
- Stock is in the incorrect location
- Human error during stock take process
- Stock loss due to theft
- Stock is labeled with incorrect identification
- Stock mistaken for similar product
- stock not recorded accurately
- Incorrect unit of measurement was counted



Common practices to avoid discrepancies include:

- Maintain a record of stocks and their locations.
- Always place similar stocks together.
- Establish adequate procedures and properly train staff.
- Record all stock movements.



Self-Check – 6

Written test

Name..... ID..... Date.....

**Directions: Answer all the questions listed below.**

**Short Answer Questions**

1. What is discrepancies?(1)
2. What are common practices to avoid discrepancies?(2)

*Note:* Satisfactory rating - 3 points      Unsatisfactory – below 3 points  
You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



### 7.1. Space between the material and the walls

The spices and herbs should be stored ensuring protection from dampness.

Spice and herbs should be stored 50 to 60 cm away from the wall. Insects, rodents and other animals should be effectively prevented from getting access to the premises where materials is stored. Stored product should preferably be exposed to sun periodically.

If care is taken during all stages of cultivation, harvesting, post-harvest handling, processing, packing, storage and transportation by following good practices and sound methods we will be able to effectively prevent contamination. The construction should be dry and well ventilated.

To reduce temperature inside the warehouse, you should paint the roof and walls outside. The warehouse should have sufficient additional floor area to permit easy stock handling and access to all stocks for inspection, and insect and pest control.



Self-Check –7	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

### Short Answer Questions

1. What is space between spices and the walls?(2)
2. Why store spices and herbs in appropriate storage (3)

*Note:* Satisfactory rating - 5 points      Unsatisfactory - below 5 points  
You can ask you teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_

### Information sheet 8: Storing all materials and products.

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## 8.1. Storing Herbs and Spices

There is a need for quality storage both on-farm and off-farm, with cool stores and warehousing facilities linked to postharvest management of spice and herbs. Spices deteriorate rapidly in adverse conditions and should be stored in well-prepared and maintained storage facilities. Keep herbs and spices in a cool, dry place and in air-tight containers.

Having identified the correct stock, make sure you move it to the correct place. Store dried herbs in plastic bags, glass jars or stainless steel containers rather than in cardboard. Pickled and preserved ginger should be kept in their original containers in the refrigerator. Dried ginger should be kept in a cool, dark space in an airtight container. Keep containers out of direct sunlight, which fades the color of the herb and reduces the strength. Storage usually is the last step in goods incoming process and meanwhile is the temporary destination of material flows.

There may also be other reasons for storing stock in a particular place:

- To avoid contamination
- To avoid spoilage, wastage or damage- some stock needs to be stored in special conditions (it may need to be kept dry, or cool, or free from dust)
- To make sure stock is used in the right sequence:
- The stock that was delivered first should be sold first (FIFO, or first in, first out).



Self-Check – 8	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

### Short Answer Questions

1. What is the reason for storing stock?(3)

**Note: Satisfactory rating - 5 points      Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_





LG #24	<b>LO #3- Sample spices and herbs for testing</b>
Instructions sheet:	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"><li>• Checking incoming vehicles that bring the raw materials</li><li>• Checking raw materials</li><li>• Taking and testing representative sample of the raw materials</li><li>• Preparing sample tests for dispatch</li></ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"><li>• Check incoming vehicles that bring the raw materials</li><li>• Check raw materials</li><li>• Take and test representative sample of the raw materials</li><li>• Prepare sample tests for dispatch</li></ul> <p>Read the specific objectives of this Learning Guide.</p> <p>Follow the instructions described below.</p> <p>Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.</p> <ol style="list-style-type: none"><li>1. Accomplish the “Self-checks” which are placed following all information sheets.</li><li>2. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).</li><li>3. If you earned a satisfactory evaluation proceed to “Operation sheets</li><li>4. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,</li><li>5. If your performance is satisfactory proceed to the next learning guide,</li><li>6. If your performance is unsatisfactory, see your trainer for further instructions</li></ol>	

## Information sheet 1: Checking incoming vehicles that bring the raw materials

### 1.1. Checking incoming vehicles

The receiving goods process starts with the arrival of transportation trucks. They will firstly check the document from the drivers and ensure that the goods are unloaded with the right volume in the receiving area. Delivery note, with the details of the goods inside and they should check whether the information consistent with actual situation .Delivery vehicles (raw material/ packing materials) shall be checked prior to, and during, unloading to verify that the quality and safety of the material has been maintained during transit.

Do not transport spices and herbs with vehicles used for transporting toxic substances, pesticides, or live animals. Clean and sanitize vehicles for transporting produce before loading. Designated personnel must check the incoming vehicles that bring the raw materials for cleanliness and hygiene should be:-

- the trucks are clean,
- Vehicles should be clean, dry, and free from infestation,
- with no pests or dirt, with no strong odor other than that of the raw material, and



Figure 1.1 Vehicle for transporting spices



## Self-Check 1.

## Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

1. How to checking incoming vehicles?(2)
2. Why checking incoming vehicle?

*Note:* Satisfactory rating – 3points      Unsatisfactory - below 3 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information sheet 2: Checking raw materials

Spices should be obtained from approved suppliers. Raw material used for the preparation of spices may be dried mechanically (e.g. forced air drying), provided that adequate measures are taken to prevent contamination of the raw material during the process. Drying time should be reduced as much as possible by using optimal drying conditions to avoid fungal growth and toxin production. To prevent the growth of microorganisms, especially mycotoxin producing mould, a safe moisture level should be achieved as rapidly as possible.

- Confirm the identity of the raw materials
- provide assurance that quality of raw materials
- Samples of incoming materials are collected and tested before use
- Approved test methods and specifications are used
- Results must conform to specifications for release for use or sale
- Transportation and storage records



## Self-Check 2.

## Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

### Write short answer

1. Write the method of checking raw material?(5)

*Note:* Satisfactory rating – 5 points      Unsatisfactory - below 5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



### Information sheet 3: Taking and testing representative sample of the raw materials

Carrying out systematic sampling, we perform extensive chemical, physical and microbiological incoming goods inspections to allow us to ensure that value-determining ingredients are included in the appropriate quantities, and that inferior or unsuitable raw materials do not enter our production process.

In this module we undertake preprocessing like testing the quality of raw material in accordance of quality parameters like moisture content, appearance, color, size, moisture content, ash level, volatile etc. Calibration involves measuring, comparing, and adjusting the performance of equipment relative to that of an accepted standard. Every instrument should be Calibration prior to every use. An instrument used to measure spice and herbs like, pH meter, texture tester, Magnetic Stirrer, thermometer, scale, moisture analyzer.

#### 1. pH meter.

Acidity or alkalinity of foods is measured using a pH meter.

The pH scale is commonly used to represent hydrogen ion activity. On the pH scale, pH values below 7 represent acidic solutions (hydrogen ion activity greater than hydroxide ion activity) while values above 7 represent basic solutions. At pH = 7, hydrogen ion and hydroxide ion activity are equal. PH meters should be standardized against buffer solutions which have a known pH.

What is a pH Meter? An instrument that measures the H<sup>+</sup> ion concentration (pH) of a solution using an ion sensitive electrode which will ideally respond to one specific ion, in this case H.

#### 2. Acidity measurement

To measure the amount of acid (such as citric acid, acetic acid, lactic acid, etc.), it is necessary to titrate a sample of the food with sodium hydroxide solution. It is not sufficient to measure the pH of a food (see pH measurement below) as this does not tell you the amount of acid present.

#### 3. Moisture content

Maximum moisture contents are set for all herbs and spices, based on the maximum allowable amount of moisture for the product to remain stable. Generally moisture content of spice and herbs is 13% max. This is measured by oven drying as described above for spices and herbs moisture content measurement.

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Figure 3.1 Digital moisture analyzer

The formula of moisture content:

$$\% \text{moisture} = \frac{(\text{initial weight} - \text{final weight})}{\text{initial weight}} \times 100$$

#### 4. Ash level

This is a measure of the level of impurities in a product, obtained by burning off the organic matter and measuring the residue of ash. This measurement is carried out by incinerating the herb or spice for 5 hours at 550°C to constant weight .

#### 5. Volatile oil (V/O) determination.

This measure helps to identify whether the herb or spice has been adulterated, perhaps by addition of foreign materials, low quality or spent amounts of the herb or spice in question. The herb or spice is boiled under reflux conditions with water where the oil separates on top of the water and can be read off in a volume proportional to the mass of the product under test. Minimum percentage levels of oil exist for most major herbs and spices.

#### 6. Scales

Weighing instruments/scales/balances are widely used in industry for various measurements. Some weighing instruments are small laboratory instruments measuring a few grams and are very accurate. Scales ensure ingredients are weighed consistently and the finished product weighs a specified amount. This is extremely important because inaccurately measured ingredients can be a source of variation in product appearance, flavor and texture.



Figure 3.1 Digital scale

### Chemical and physical characteristics

The following values are suggested for chemical and physical parameters as they are in line with the current trading practices:

Table 3.1.chemical and physical characteristics of raw materials

Quality parameters	Specification / standard
Moisture content	$\leq 12,0$
Total ash	$\leq 12,0$
Acid insoluble ash	$\leq 3,2$
Volatile oil	$\geq 1,0$
Extraneous matter	$\leq 5\%,0$
Foreign matter	Practically absent



### pH Meter Calibration procedure

**Step: 1.** Turn on the pH meter before begin calibrating and use your pH meter.

**Step: 2** Rinse with deionized water (distilled water) and very carefully pat dry with a Kim wipe.

**Steps: 3.** Prepare your buffers. Check the neutral buffer with a PH of 7 or 0.025 potassium hydrogen phosphate solution (3.387 g of the chemical dissolved in 1 litre of distilled water. immerse electrode in fresh pH 7.00 buffer, stir.

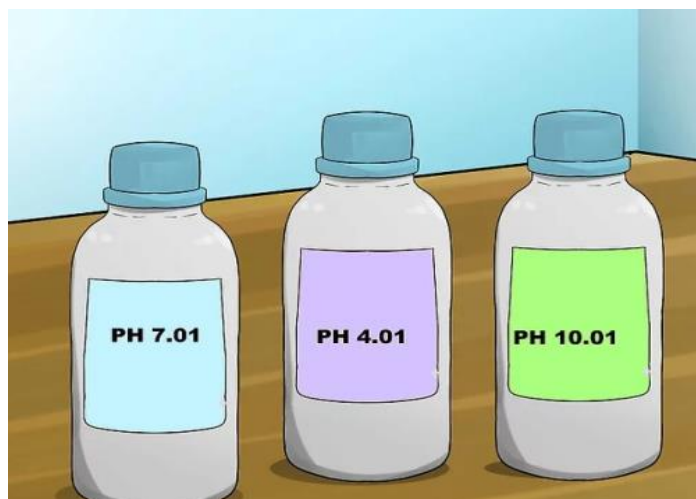


Figure 3.3 Buffer solution

**Steps 4:** Repeat step 2. Allow the pH reading to stabilizing before letting it sit for approximately 1-2 minutes.

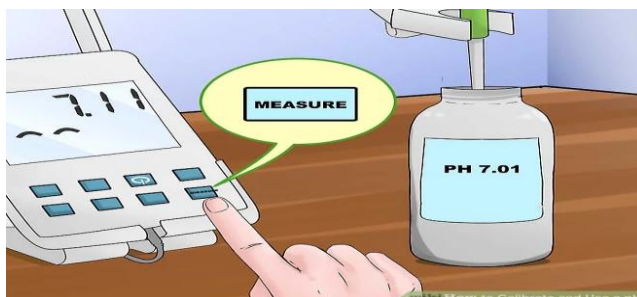


Figure 3.3 Calibration

**Step: 5.** Set the pH meter. Once you have a stable reading, set the pH meter to the value of the buffer pH by pressing the measure button a second time. Setting the pH meter once the reading has stabling will allow for more accurate and tuned readings.



Figure 3.3 Set the pH meter

**Step 6-** meter will recognize as pH 7 buffers, and displays calibration slope of

When finished the Calibration of pH meter

- a) Rinse and dry electrode
- b) Slide rubber sleeve to cover fill hole
- c) Return electrode to storage solution
- d) Turn off stir plate and clean up any mess



## Operation sheet: 2-To measure acidity in spices and herbs

### Steps to measure acidity

1. Take a 10 ml sample of liquid food or 10 g of solid food
2. If solid, the food should be liquidized to a fine pulp
3. Mix the sample with 90 ml of distilled water, making sure that it is completely mixed
4. Add about 0.3 ml of an indicator solution (1% phenolphthalein in 95% solution of ethanol)
5. Fill a burette with 0.1 M sodium hydroxide solution and titrate the sample until there is a pink color that does not change.
6. Calculate the amount of acid as % acid per ml of liquid food or per g of solid food using the formula: % acid = number of ml of sodium hydroxide x one of the conversion factors below: acetic acid (vinegar) 0.060, citric acid 0.070, tartaric acid 0.07 and lactic acid 0.090



## Acid-Alkaline Spices and Herbs Food List

Acid/Alkali Spices and Herbs

Food Description	KCals	Very Alkaline	Slightly Alkaline	About Neutral	Slightly Acid	Very Acid
Basil, fresh	27	-10.01				
Capers, canned	23		-0.69			
Dill weed, fresh	43	-15.49				
Horseradish, prepared	48		-4.87			
Mustard, prepared, yellow	67				1.13	
Peppermint, fresh	70	-12.65				
Rosemary, fresh	131	-16.45				
Salt, table	0		-0.50			
Spearmint, dried	285	-55.42				
Spearmint, fresh	44	-10.01				
Spices, allspice, ground	263	-26.86				
Spices, anise seed	337	-18.17				

Figure 3.3.acid-alkaline spice and herbs food list.



Self-Check 3.

Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

### Short answer

1. What is PH meter?(2)
2. What is pH of acid ?(1)
3. What is scale?(2)

*Note:* Satisfactory rating – 5 points      Unsatisfactory - below 5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



LAP Test 1: calibrate PH meter

Performance Test

Name..... ID.....

Date..... Time started: 2:30 Time finished: 3:00

### Operation sheet; Steps to calibrate PH

**Task 1: wear appropriate PPE**

**Task 2: Select necessary material used for calibrate PH meter?**

**Task 3: Carry out procedures of calibrate PH meter?**



LAP Test 1: Measurement of acidity of spices

Performance Test

Name.....ID.....Date.....

Time started: 2:30

Time finished: 3:30

**Perform the following tasks**

**Task 1: carrying out the measurement acidity of spice and herbs?**

**Task 2: use personal protective equipment**

**Task 3: calibrating the PH meter?**



#### Information sheet 4: prepare sample tests for dispatch

Dispatch is responsible to complete work order from beginning to end and include any updates; Check first to see if the site has submitted a new work order and change the priority if this has been done; during emergencies dispatch follows and completes the emergency Dispatch checklist. The establishment manager is to provide laboratories with the contact details of the department contact point as part of their arrangements with the testing laboratory.

It is the responsibility of the Dispatcher to correctly monitor notifications and recognize emergencies to ensure municipalities have been contacted. For example First Shift standard work hours: 6:00 am to 2:30 pm, second shift standard work hours: 7:00 am to 3:30 pm c. If two dispatch operators are off in the same zone, Supervisors will notify all dispatchers in area to cover work orders and calls.





## Self-Check 4.

## Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

### Short answer

1. What is dispatch ?(3)

*Note:* Satisfactory rating – 3points      Unsatisfactory - below 3 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



LG #25	LO #4- Move spices and herbs into and out of storage
Instruction sheet	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"><li>• Identifying spices and herbs for handling and storage facility</li><li>• Selecting appropriate silo types and handling equipment</li><li>• Segregating spices and keeping appropriate records and documentation</li><li>• Taking measurements to minimize pest and microorganism infestation</li><li>• Moving spice and herbs into and out of storage to Occupational Health and Safety (OHS) requirements</li><li>• Checking spices and herbs contamination regularly</li><li>• Cleaning storage and analysis equipment</li><li>• Dismantling temporary storages</li><li>• Implementing suitable measurement and equipment checks</li><li>• Using other equipment in storage and handling</li></ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"><li>• Identify spices and herbs for handling and storage facility</li><li>• Select appropriate silo types and handling equipment</li><li>• Segregate spices and keeping appropriate records and documentation</li><li>• Take measurements to minimize pest and microorganism infestation</li><li>• Move spice and herbs into and out of storage to Occupational Health and Safety (OHS) requirements</li><li>• Check spices and herbs contamination regularly</li><li>• Clean storage and analysis equipment</li><li>• Dismantle temporary storages</li><li>• Implement suitable measurement and equipment checks</li><li>• Use other equipment in storage and handling</li></ul>	
Learning Instructions:	



Read the specific objectives of this Learning Guide.

Follow the instructions described below.

Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

1. Accomplish the “Self-checks” which are placed following all information sheets.
2. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
3. If you earned a satisfactory evaluation proceed to “Operation sheets
4. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
5. If your performance is satisfactory proceed to the next learning guide,
6. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

## Information sheet 1. Identifying spices and herbs for handling and storage facility

Whole spices stay fresh for up to 2 years while ground spices have a 6-month shelf life. Prior to storing spices and herbs, all surfaces that may come in contact with the newly harvested spices and herbs should be cleaned. Stored spices do best in temperatures below 70° and in lower humidity environments. Some people like to store red spices like chili powder, cayenne pepper and paprika in the refrigerator to prevent loss of color and flavor. There are some of the raw materials such as Pepper, Ginger, Turmeric, Fenugreek, Thyme, Cardamom, Vanilla, Saffron, Clove, Rosemary, Black, green and white pepper, Garlic, Cinnamon, Lemon grass, Lemon balm, Onion, Oregano etc..



Keep your spices tightly covered and store them in a cool, dry place. Store red spices, such as paprika and red pepper, in the refrigerator. They will hold their color and keep their flavor longer. Immediately after harvesting, peppers should be cooled to 7°C. If they are allowed to remain at high temperature for more than 1 to 3 hours they will begin to show signs of shriveling, shrinkage and softening.



### 1.1. Conditions of storage facility

- Maintain quality and quantity
- Protect from pests
- Protect from moisture
- Protect from destructively high or low temperatures
- Protect from objectionable odors and contamination
- Protect against unauthorized distribution



## Self-Check 1.

## Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

1. What is storage facility for spices and herbs(3)
2. Write handling method of spices and herbs(2)

*Note:* Satisfactory rating – 5 points      Unsatisfactory - below 5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information sheet: 2. Select appropriate silo types and handling equipment

Silo is most use for grain storage .A silo is a structure for storing bulk materials. Silos are used in agriculture to store grain or fermented feed known as silage. Silos are commonly used for bulk storage of grain/seed, coal, cement, carbon black, woodchips, food products and sawdust. But some spice like sesame stored in silo. Handling system of silo should :-

- Protect the silo from the sun and the rain.
- Place the silo on an even wooden platform.
- Do not put bags containing fertilizers close to the silo. They may cause oxidation.
- Do not put heavy objects on top of the silo.

### 2.1. Types of silo

Appropriate silo types and handling equipment are selected with other personnel for various Spices and herbs in relation to their storage characteristics and flow. The ginger may be placed in clean baskets, dry sacks, trailers, aerated containers and carried to a central point for transport to the processing facility. If plastic containers are used, particular attention should be paid to any possible retention of moisture that could lead to the growth of mold. When containers are not in use, they should be kept in dry conditions, in an area that is protected from insects, rodents, birds and other pests, and inaccessible to livestock and domestic animals. Silo may include,

- silo conveyors
- elevators
- chutes
- auger

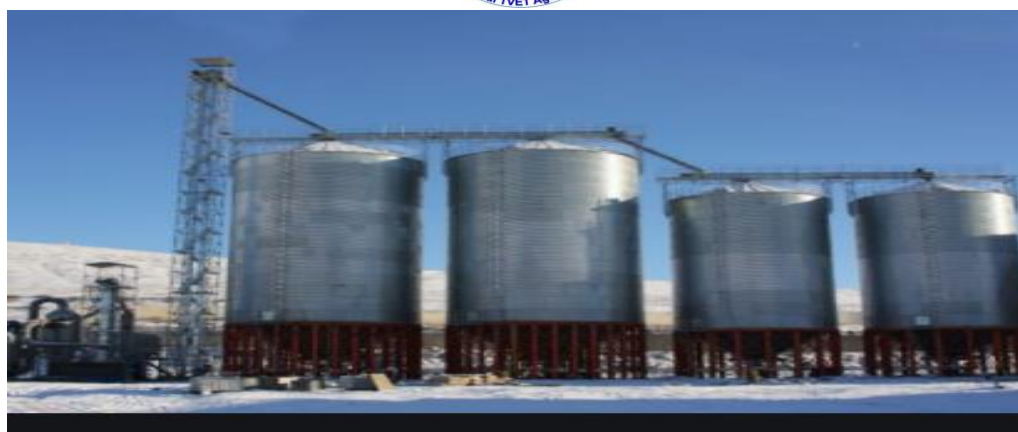


Figure 2.1 sesame silo

## 2.2. Handling equipment

The containers and conveyances for transporting the source plant material or Spices and dried aromatic herbs from the place of production to storage for processing should be cleaned and disinfested, as appropriate, before loading. Products should be protected, where practicable, against outdoor conditions when transported. Checking oil and part of equipment needs maintenance. Equipment should be installed so as to allow access for cleaning and to minimize transfer of dust particles to other pieces of equipment or to the environment. The risk of contamination from equipment should be assessed and controlled. Wherever possible, forklifts, utensils, and maintenance tools for the finished product and packaging areas should be different from those used in the “raw” material area.

Equipment and containers that come in contact with food and used for handling, storage, processing and packaging shall be made of corrosion free materials which do not impart any toxicity to the food material. Equipment and containers for waste, by-products and inedible or dangerous substance, shall be specifically identifiable and suitably constructed. Containers used to hold cleaning chemicals and other dangerous substances shall be properly identified and stored separately to prevent malicious or accidental contamination of food.





## Self-Check 2.

## Written Test

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

Directions: Answer the questions listed below.

### **Short answer**

1. what is silo ?(1)
2. what is the importance of silo ?(2)

*Note:* Satisfactory rating – 5 points      Unsatisfactory - below 5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



### Information sheet 3: Segregating spices and keeping appropriate records and documentation

Segregate means setting apart or separation of things from others.

The first stage is to remove dust and dirt using a winnowing basket. This can be made locally from bamboo, palm or other leaves. A worker who is used to doing this can clean up to 100kg of cardamom in an eight hour day. Small machines are available for cleaning, but they are often not cost effective. Stalks are removed from the cardamom capsules by hand.



### Self-Check 3.

### Written Test

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

Directions: Answer the questions listed below.

#### 1. Why we segregate spice and herbs (2)

*Note:* Satisfactory rating – 3 points      Unsatisfactory - below 3 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



#### Information Sheet 4: Take measurements to minimize pest and microorganism infestation

Maintaining a clean and tidy workplace also provides a safer environment. Appropriate measures should be taken at each step in the food chain to minimize the potential for contamination of spices by microbial pathogens (including mycotoxin-producing moulds), chemical contaminants, excreta, rodent hair, insect fragments and other foreign materials. All containers should be closeable to prevent infestation by pests or accidental contamination by foreign bodies or micro-organisms.

Fumigation against pest infestation should be carried out only when necessary, and should be carried out by licensed or trained personnel. Correct drying, aerating, and managing stored spices and herbs minimizes the risks of quality deterioration due to pests. When tested by appropriate methods of sampling and examination, should:

- Be free from pathogenic and toxigenic microorganisms
- Not contain any substances originating from microorganisms,
- Not contain levels of insect, bird or rodent contamination
- Not contain chemical residues resulting from the treatment of spices and dried aromatic herbs.



#### Self-Check 4.

#### Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

1. What are the measurements taking to minimizing pest and micro-organsim ?(3)
2. What is fumigation?(2)

*Note:* Satisfactory rating – 5points

Unsatisfactory - below .5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information Sheet 5: Moving spice and herbs into and out of storage to OHS requirements

### 5.1. Storage to OHS requirements

Condition of storage facilities to eliminate or minimize OHS risks; the range of actions are both systemic and at an operational level. Systems should be in place to ensure the safe operation and maintenance of machinery and equipment. Systems and procedures for handling and storing spices and herbs, as well as working with and around electricity should also be in place. Personal protective equipment should be selected, used and maintained environmental conditions should be controlled.

Spices and dried aromatic herbs should be loaded, transported, and unloaded in a manner that protects them from any damage or water. Care should be taken to prevent condensation when unloading spices and dried aromatic herbs from a refrigerated vehicle or while taking out of a cold storage. In warm, humid weather, the products should be allowed to reach ambient temperature before exposure to external conditions. Transport spices and herbs using clean and odor-free containers and equipment, which are easy to lift and can be thoroughly cleaned. Vehicles for transporting must be clean and not used for transporting toxic substances.

### 5.2. Occupational health and Safety hazard

Occupational health and safety hazard may include:

- Chemicals and hazardous substances
- Dust
- Incorrect manual handling
- moving vehicles
- Noise
- Sharp hand tools and equipment
- Slippery and uneven surfaces



### Common Sources of workplace hazards

a) **Mechanical hazards.** Plant, equipment and items (and parts of them) that have the potential to cut, rip, tear, abrade, crush, penetrate, produce projectiles or cause sudden impact.

b) **Chemical and biological hazards;-**

Chemicals, compounds, materials, powders, dusts and vapors that have the potential to impair health, , cause disease or have explosive, flammable, toxic or corrosive properties.

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**Self-Check 5.****Written Test**

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

**Sources of workplace hazards**

1. Write the common Sources of workplace hazards?(2)
2. Occupational health and safety hazard may include?(2)

Note: Satisfactory rating – 4 points                      Unsatisfactory - below 4 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_





### 6.1. Checking spice and herbs contamination

Checking the effective measures should be taken to prevent cross-contamination. Spices and dried aromatic herbs by direct or indirect contact with potentially contaminated material at all stages of the processing. Spices and dried aromatic herbs are susceptible to mould contamination and/or growth if storage conditions are not appropriate. Special precautions should be taken to reject spices and dried aromatic herbs showing signs of pest damage or mold growth because of the potential for them to contain myco toxins such as aflatoxins. Dried product processing generally involves cleaning (e.g. Culling, sorting to remove debris), grading, sometimes soaking, slicing, drying, and on occasion grinding/cracking. Spices and dried aromatic herbs that have undergone a microbial reduction treatment should be processed and stored separately from untreated spices and dried aromatic herbs.



Self-Check 6.	Written Test
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Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer the questions listed below.

1. What are the elements consider to check spices and herbs contamination?(3)

*Note:* Satisfactory rating – 5points      Unsatisfactory - below .5 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_

## 7.1 Cleaning storage

The storehouses should be damp-proof, vermin- proof, and bird- proof as well as having controlled ventilation as well as devices to regulate humidity and temperature, where possible. The room should be fumigated before storage, the walls need to be washed regularly and the facility should be kept dry. Only registered chemical agents authorized by the regulatory bodies of the source country and the countries of intended end-use should be used. The storage room should be clean, dry, cool and free from pests. Do not mix new spices and herbs with old. Old, infested material should be removed or thoroughly fumigated. Cleaning daily the storage area

- Washing the equipment
- Chemical application for insects
- Vacuum cleaner
- Keep the warehouse clean



**Figure 7.1. Cleaned spice's jar**

## 7.2. Analysis equipment

Conveyances used for transporting bulk plant materials from the place of production to the place of storage for processing should be cleaned between loads. Bulk transport, such as ship or rail cars, should be cleaned, and where appropriate, well ventilated to remove moisture from plant materials and to prevent condensation.

Handling equipment may include the following

**Conveyor:** Transporting various kinds of granular materials or goods whose bulk density is from 0.5t/m to 2.5t/m. Its operating temperature is defined from -25°C to 40°C. This capable of horizontal machine is transporting and slanting transportation, combining curved segment transporting and concave-convex straight-line segment transporting.

**Elevator:** The process of seed cleaning can be very time and labor consuming, as the seeds need to be poured into the cleaning machines, and also need to be collected after the process of cleaning. To make the procedure for cleaning the seeds easier, Seed Elevators or Bucket Elevators play a very important role. They are used to lift the seeds and beans into the machine, thus saving time as well as labor. These are not used only during the process of cleaning but for every lifting or transporting work related to the seeds.



**Fig.2. elevators**



## Self-Check 7.

Written test

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

Directions: Answer the questions listed below.

1. What is the advantage of cleaning storage ?(1)
2. How analysis equipment? (1)

### **Write true/false(each has two points)**

1. Storage management is important for all types of storage functions(2)
2. Conveyor is used for transporting various kinds of granular materials or goods(2)

*Note:* Satisfactory rating – 6points      Unsatisfactory – below 6 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_



## Information sheet: 8.Dismanting temporary storages

### 8.1. Storage principles

Various techniques and facilities have been used to store spices and herbs temporarily. Generally, the more durable the facility, the longer receipt can be stored without excess loss. Losses were 1-4% for temporary bins set on a plastic sheet and covered with a plastic sheet. Venting out moisture at the top of the covered receipt pile may be needed. Receipt a smooth cone shape until it spills over the top edge of bin walls drained best. Spoilage occur a few inches below the grain surface, so frequent checking by probing is important.

### 8.2. Storage structure

Make sure the building location is well drained. If the building does not have a concrete floor, place the grain on plastic to prevent moisture moving from the ground to the spices. Even with a concrete floor, it is advisable to cover the concrete with plastic, especially if the concrete is cracked. Moisture vapor will move through concrete and into the spices if the soil below the concrete is wet.

Most farm buildings are not built to withstand lateral loads other than those normally sustained from wind pressure, so they will need to be strengthened to support spices pressure. Check with the building manufacturer about safe depth of grain to use in existing commercial buildings. Temporary spices storage facilities need to protect the grain from moisture, wind, birds, rodents, and insects. Thus, storage in an existing building (such as a pole barn, machinery shed, warehouse, or even livestock building) is preferred over outdoor piles. If the building previously contained manure, chemicals, or petroleum products, it may not be possible to completely remove



Self-Check- 8

Written test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

**Directions: Answer the questions listed below.**

1. What is the advantage of dismantle temporary storage?(2)
2. Why dismantle temporary storage?(3)

*Note:* Satisfactory rating – 3 points

Unsatisfactory – below3 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information sheet: 9.Implementing suitable measurement and equipment checks

Suitable measures and equipment checks are implemented to minimize the effect of desiccant dusts on the flow properties of spices and herbs. Before start operates equipment you should have to check oil level of machine and performance. Desiccants are commonly used to keep products dry and stable. Dry desiccants can absorb moisture from air either by physical adsorption or by chemical reaction, and thus reduce the humidity in the headspace of sealed containers.

Desiccants are a hygroscopic substance that is used to induce or sustain a state of dryness (desiccation). Areas around storage structures and equipment should be kept clean. It is essential to plan a cleaning program and to have specific cleaning equipment. Equipment, which need not be expensive, would include an air compressor and fittings, air guns, vacuum cleaner, firefighting pump and hose and brooms. Hygiene methods which eliminate insect and dust form from spices and herbs storage:

- Cleaning daily the storage area
- Washing the equipment
- Chemical application for insects
- Vacuum cleaner





## Self-Check 9.

### Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

**Directions:** Answer all the questions listed below.

1. Write the hygiene methods used to eliminate insect and dust form from spices and herbs storage? **(2)**
2. What are measurement take to minimize the effect of dust? (2)

*Note:* Satisfactory rating –4 points

Unsatisfactory - below 4 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information sheet: 10 using other equipment in storage and handling

Employees must never ride on a materials handling conveyor. Where a conveyor passes over work areas or aisles, guards must be provided to keep employees from being struck by falling material. Screw conveyors must be completely covered except at loading and discharging points. At those points, guards must protect employees against contacting the moving screw; the guards are movable, and they must be interlocked to prevent conveyor movement when not in place. Other equipment are used in storage and handling of spices and herbs for facilitation as work place requirement.

- two way radio/telephone
- front end loaders
- wall charts and other visual recording methods
- warning devices
- ventilation/aeration equipment
- air blower

..



Self-Check 10

Written Test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer all the questions listed below. Use the Answer sheet provided on the provided space.

### Short Answer

1. What are using other equipment in storage and handling(2)

*Note:* Satisfactory rating – 2 points

Unsatisfactory - below 2 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



LG #26	<b>LO #5 Assist in documentation of the inward &amp; outward stock</b>
Instruction sheet	
<p>This learning guide is developed to provide you the necessary incoming goods information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"><li>• Recording all received raw materials</li><li>• Maintaining a register or on computer by furnishing the details of the inward &amp; outward stock</li><li>• Coordinating with the suppliers on the stock information and documentation</li></ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"><li>• Record all received raw materials</li><li>• Maintain a register or on computer by furnishing the details of the inward &amp; outward stock</li><li>• Coordinate with the suppliers on the stock information and documentation</li></ul>	

Learning Instructions:
<p>Read the specific objectives of this Learning Guide.</p> <p>Follow the instructions described below.</p> <p>Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.</p> <ol style="list-style-type: none"><li>1. Accomplish the “Self-checks” which are placed following all information sheets.</li><li>2. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).</li></ol>



## Information sheet 1: Recording all received raw materials

### 1.1. Recording all received raw materials

A record of all the raw materials received, along with the details of the supplier, transport vehicles, date and time of receipt and the test results obtained from the laboratory should be maintained. A record of all the raw materials received including.

- Quantity of raw material received
- Quality of raw material received (physical, chemical and microbial)
- Stock checks
- Calibration records
- Sanitation records
- Maintenance to be conducted
- Corrective action records
- Distribution records
- Inspection records (e.g., incoming product, facility, production area)
- Microbiological contamination records etc.
- Quantities and grades spices and herbs receiving
- Spices and herbs movements and cartage documentation
- Equipment and operations log sheets
- Transport vehicles,
- Date and time of receipt
- Test results obtained from the laboratory should be maintained.



Self-check 1	Written test
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Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer all the questions listed below.

### Short Answer

1. What are information recorded for the raw materials received (2)

*Note:* Satisfactory rating – 2 points                      Unsatisfactory - below 2 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Information sheet 2: Maintaining a register or on computer inward & outward stock

Maintaining a register or on computer by furnishing the details of the inward & outward stock. Using Computer database to record inward and out ward stock to sure the stock. A company is required to maintain electronic back up of all the record and preserved in a manner that in the event of destruction of record to accident or natural causes, the information can be restored within a reasonable period of time.it can be in hard copy or in electronic readable format duly authentic by the a company. Recording stock in database by category into amount of quantity of stock received, amount of purchased, amount of remained in store, date of stock received and the date expired. Electronic Data Interchange (EDI): An electronic stock recording system where a computer which is linked to Point Of Sale (POS) equipment records all sales and automatically recalculates stock levels.



Self-check 2	Written test
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Name\_\_\_\_\_ ID \_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer all the questions listed below.

### Short Answer

1. what is the advantage of recording stock in database?(2)

*Note:* Satisfactory rating – 2 points

Unsatisfactory - below 2 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_
2. \_\_\_\_\_





### Information sheet 3: Coordinating with the suppliers on the stock information and documentation

Manufacturer has established a clear plan for how to communicate with suppliers at the very beginning of new relations. If your supply chain is made up of multiple organizations in geographically dispersed locations, communication can allow you to stay in touch so that you can manage it more efficiently. From the beginning, set expectations for the data you need from your suppliers. Once you have that, provide a consistent platform in which your supplier can carry out those expectations. Online chat increases collaboration among partners, allows for visibility within group conversations, provides real-time updates on logistical information, and provides the ability to share critical project data and knowledge, improve relationships, and monitor progress across the entire supply chain and more. From the beginning, set expectations for the data you need from your suppliers. Once you have that, provide a consistent platform in which your supplier can carry out those expectations. A supply chain can become highly streamlined or remain stagnant based on relationship with your vendors.



Self-check 3

Written test

Name\_\_\_\_\_ ID\_\_\_\_\_ Date\_\_\_\_\_

Directions: Answer all the questions listed below.

### Short Answer

1. How the manufacturer Coordinating with the suppliers?(2)

*Note:* Satisfactory rating – 2 points

Unsatisfactory - below 2 points

You can ask your teacher for the copy of the correct answers.

Name \_\_\_\_\_

Answer

1. \_\_\_\_\_

2. \_\_\_\_\_



## Reference Materials

### Book:

1. Codex code of hygienic practice for spices and dried aromatic plants (CAC/RCP 42-1995)
2. Food Industry Guide to implement GMP/GHP requirements Spice Processing Based on Schedule 4 of Food Safety & Standards (Licensing & Registration of Food Businesses) Regulation, 2011 First Edition October 2018 Online available at [www.fssai.gov.in](http://www.fssai.gov.in)

### Web address

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No	Name	Qualification	Educational background	Region	Phone Number	E-mail
1	Tesfaye Tekola	A	Agronomy	Benishangul	0910550651	<a href="mailto:ttekola@gmail.com">ttekola@gmail.com</a>
2	Kelemu Dessie	A	Horticulture	Amhara	0921846332	<a href="mailto:kelemudessie2013@gmail.com">kelemudessie2013@gmail.com</a>
3	Yared Mulugeta	A	Food Process & Preservation Technology	SNNPR	0913256626	<a href="mailto:yayaet84@gmail.com">yayaet84@gmail.com</a>
4	Bogale Tesfaye	A	Food Security & Development Study	Addis Ababa	0920308594	<a href="mailto:bogalt19@gmail.com">bogalt19@gmail.com</a>

**The trainers who developed this learning guide**