



BEE PRODUCT PROCESSING- LEVEL- II

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Module Title: Conducting Products Sampling Procedures

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LG #22**LO #1- Prepare for sampling****Instruction sheet**

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

- Identifying sampling requirements
- Preparing sampling equipment, containers and labels

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:

- Identify sampling requirements in accordance with the sampling plan and procedure.
- Preparing sampling equipment, containers and labels.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. 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.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. 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).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Identifying sampling requirements

1.1 Introduction

Sample is portion of a material collected according to a defined sampling procedure. The size of any sample should be sufficient to allow all anticipated test procedures to be carried out, including all repetitions and retention samples. If the quantity of material available is not sufficient for the intended analyses and for the retention samples, the inspector should record that the sampled material is the available sample and the evaluation of the results should take account of the limitations that arise from the insufficient sample size.

The objective of this unit is required to understand the requirements of sampling plans, and to collect and transfer samples to retain sample integrity. Following specific sampling procedures such as aseptic sampling is considered in this learning guide. The sampling equipment include mainly sampling under standard conditions and sampling after processes are adjusted in response to variation or non-conformance

1.2 Sampling Requirements

Sampling is the act of selecting a certain portion, number of containers or product units from a particular lot of the beeswax and honey. Regulatory samples should be collected in two sets and divided into four subsets. The category of analysis for foods should be defined according to the requirement for regulatory or monitoring purpose.

- Chemical analysis: Required chemical tests to prove the safety of the product. Nutritional tests required if product exhibits a claim
- Microbial analysis: Test for Absence of pathogens and safety in microbial counts
- Physical analysis: Test for extraneous matter, damaged product
- Sensory analysis: Test for retention of original characteristics including flavour, texture etc and other expected characteristics

Sampling method

That part of the sampling procedure dealing with the method prescribed for withdrawing samples.

Sampling unit

Sampling unit is the discrete part of a consignment such as an individual package, drum or container.

Selected sample

Selected sample is sample obtained according to a sampling procedure designed to select a fraction of the material that is likely to have special properties. A selected sample that is likely to contain deteriorated, contaminated, adulterated or otherwise unacceptable material is known as an extreme sample.

Purpose of sampling

Sampling may be required for different purposes, such as pre-qualification; acceptance of consignments; batch release testing; in-process control; special controls; inspection for customs clearance, deterioration or adulteration; or for obtaining a retention sample.

The tests to be applied to the sample include:

- verifying the identity
- performing complete analogous testing
- performing special or specific tests

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

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

Test II: Short Answer Questions

1. What does sample and sampling mean? (2 points)
2. Mention and discuss the requirements of sampling (12 points)
3. How prepare honey sample for analysis (6 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

2.1 Sampling facilities

Sampling facilities are facilities used to perform the sampling process. Sampling equipments, containers and labels are categorized under sampling facilities. Sampling facilities should be designed to:

- prevent contamination of the opened container, the materials and the operator
- prevent cross-contamination by other materials, products and the environment
- protect the individual who samples (sampler) during the sampling procedure.

Sampling from large containers of starting material or bulk products can present difficulties. Whenever possible, this work should be carried out in a separate, closed cubicle within the warehouse, to reduce the risk of contamination (e.g. by dust) of either the sample or the materials remaining in the container, or of cross-contamination.

Some materials should be sampled in special or dedicated environments (e.g. when sampling articles for which contamination with dirt or particles from the environment should be avoided, such as aerosol valves, hormones and penicillins).

Generally, taking the original sales pack as a sample from outlets such as pharmacies or hospitals does not present problems. However, the inspector should ensure that the quantity of sample taken is sufficient for the intended analyses and for the retention samples, and that all units sampled are derived from the same batch and preferably from the same location.

2.2 Sampling Equipment

The laboratory sample must be placed in a clean, inert container which provides secure protection from contamination, damage and leakage. Material of the container should be inert. Containers used for sampling should be air tight for chemical analysis and sterile for microbiological analysis. The container should be sealed, the sampling record must be attached and the sample delivered to the laboratory as soon as practicable. Containers liquid/semi-solid products should preferably be of inert materials, glass or

plastic. The containers should preferably be of appropriate size, capable of air-tight closure and preferably dark-coloured so as to prevent light-based degradation.

There are about seven types of equipment and materials used to taking sample from most of food products. These include:

1. Mechanical blender. Several types are available. Use blender that has several operating speeds or rheostat. The term "high-speed blender" designates mixer with 4 canted, sharpedge, stainless steel blades rotating at bottom of 4 lobe jar at 10,000-12,000 rpm or with equivalent shearing action. Suspended solids are reduced to fine pulp by action of blades and by lobular container, which swirls suspended solids into blades. Wiring blender, or equivalent, meets these requirements.
2. Stomacher and sterile stomacher bags
3. Sterile glass or metal high-speed blender jar, 1000 ml, with cover, resistant to autoclaving for 60 min at 121°C
4. Balance, with weights; 2,000 g capacity, sensitivity of 0.1 g
5. Sterile beakers, 250 ml, low-form, covered with aluminum foil
6. Sterile graduate pipets, 1.0 and 10.0 ml
7. Sterile knives, forks, spatulas, forceps, scissors, tablespoons, and tongue depressors (for sample handling)



Figure : Sample collecting Jar (it may be glass or food graded glass)



SteriWare ViscoThif- ideal for single use cream sampling: Avoid time consuming cleaning with our disposable ViscoThief samplers. It takes fast samples of viscous materials like honey, creams, pastes and thick fluids.

Figure : Sample collecting Equipment (SteriWare ViscoThif)



Figure : Sample collecting Equipments (Sampling trowel and Plastic bottles, wide opening, not transparent)

2.3 Containers

Preferable type of container used for chemical and microbiological analysis should be the same for ease. Samples of food which are not pre-packed or opened cans or packets of foods should first be placed in clean, dry leak-proof containers such as wide-mouth glass or food quality plastic jars, stainless metal cans or disposable food quality plastic bags. Jars, bottles or cans should be suitably closed. Disposable food quality plastic bags should be sealed securely after filling so that they cannot leak or become contaminated during normal handling. Samples of alcoholic drinks should be placed in glass bottles. Samples for microbiological examination should be taken and handled in a manner that eliminates the risk of contamination during the sampling process.



Figure : Jar used as a container for honey

2.4 Labels

Labeling may seem like a simple task. But when you think about it, your lab labels are an integral part of the success of your lab. They house critical data, and without them, your samples would be unreliable and simply irrelevant. Those labels are your source of identification, and if implemented correctly they are the foundation of your internal sample management process.

Labels are a powerful tool for laboratory success. In the end, labeling is a bit more complex than it may seem. But those labels can be a powerful, effective tool that impacts the overall success of not only your lab, but labs around the world. Labels can increase efficiency; improve accuracy; reduce errors; and enable a scientific community to share data, resources and learning.

As technology continues to progress and regulatory requirements continue to expand, there's no doubt that laboratories are going to see a number of advancements relating to labeling and identification in the future. Now is the time to implement a productive labeling system that accounts for the flow and processes of your lab—both for today and for tomorrow. The integrity of your data and the quality of your services depend on it.



Figure : Labels on sample of honey

The label should also specify the nature of analysis to be conducted Qualitative, Quantitative, Microbiological and Chemical. Sample of honey must be labelled with information including:

- date of extraction
- apiary identification
- floral source (code)
- batch number (if relevant)
- identification number of the drum from which the sample has been taken.

Self-Check – 2	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.

Test I: Short Answer Questions

1. Mention the seven types of equipment and materials used to taking sample from most of food products (7 points)
2. What is the designed purpose of Sampling facilities (3 points)
3. Discuss sampling equipment, container and labels in sampling of honey (5 points)
4. Mention the information required to label on honey sample (5 points)

Note: Satisfactory rating - 20 points

Unsatisfactory - below 20 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

Instruction sheet

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

- Collecting samples
- Preparing and handling samples
- Applying sampling techniques
- Taking representative sample ratio
- Identifying and reporting defects
- Recording sample information as workplace information
- Workplace housekeeping standards

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:**

- Collect samples according to sampling procedures and the requirements of the sampling plan
- Handle and prepare samples to preserve sample and source integrity
- Apply sampling techniques based on sampling procedures
- Take representative sample ratio according to sampling procedures
- Identify and report defects or abnormalities in source material and/or sample
- Record sample information according to workplace information
- Meet the workplace housekeeping standards

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Information Sheet 1- Collecting samples

Samples are collected according to sampling procedures and the requirements of the sampling plan.

1.1 Sampling Procedure

Sampling procedures are the complete sampling operations to be performed on a defined material for a specific purpose. A detailed written description of the sampling procedure is provided in the sampling protocol. The objective of the sampling procedures is to ensure that any sample procured is a 'fair sample' that accurately reflects the constituents of the bulk material being sampled. As a general there are four procedures to be followed at sample taking from food and beverage products. These are:

General Sampling Procedure: Sampling procedures should be performed in accordance with appropriate Standards related to the commodity of concern.

Employment of Food Safety Officer or Sampling Personnel's: Sampling should be performed by persons trained in the techniques of sample collection by the importing country

Material to be Sampled: Each lot that is to be examined must be clearly defined. The appropriate regulatory body should stipulate how a consignment should be handled in instances where no lot designation exists.

Representative Sampling: The representative sampling is a procedure used for drawing or forming a representative sample. The requirements of this clause shall be, if needed, completed by procedures (such as how to collect and to prepare a sample). But, in detail there should be perform under sampling procedures the following activities.

- Define each lot that is to be examined must be clearly
- Identify appropriate sampling equipments
- Clean equipments based on the requirement standard

- Taking a representative sample
- Labeling on the container
- Send to the laboratory or Examine the analysis of the required parameters from the sample
- Identify the findings with the standard
- Record keeping and report to the appropriate personnel

1.2 Sampling plan

Sampling plan is the description of the location, number of units and/or quantity of material that should be collected, and associated acceptance criteria. The choice of a sampling plan should always take into consideration the specific objectives of the sampling and the risks and consequences associated with inherent decision errors.

Sampling plans are required which ensure that fair and valid procedures are used when food is being controlled for compliance with a particular commodity standard. Since numerous, yet often complex, sampling plans are available it is the purpose of these guidelines to help those responsible for sampling to select sampling plans that are appropriate for statistical inspections under specifications laid down in standards. No sampling plan can ensure that every item in a lot conforms. These sampling plans are nevertheless useful for guaranteeing an acceptable quality level.

Governments and other users should address for the selection of appropriate sampling plans, when setting-up specifications.

- **Nature of the control**
 - ✓ Characteristic applicable to each individual item of the lot
 - ✓ Characteristic applicable to the whole lot (statistical approach)
- **Nature of the characteristic to control**
 - ✓ Qualitative characteristic (characteristic measured on a pass/failed or similar basis, i.e. presence of a pathogen micro-organism)
 - ✓ Quantitative characteristic (characteristic measured on a continuous scale, for example a compositional characteristic)

- **Choice of the quality level (AQL or LQ)**
 - ✓ In accordance with the principles laid down in the FSSA Manual and with the type of risk: critical/non-critical non-conformities.
- **Nature of the lot**
 - ✓ Bulk or pre-packed commodities
 - ✓ Size, homogeneity and distribution concerning the characteristic to control
- **Composition of the sample**
 - ✓ Sample composed of a single sampling unit
 - ✓ Sample composed of more than one unit (including the composite sample)
- **Choice of the type of sampling plan**

Sampling plan needs to be specified. Single sampling plans for inspections of percent non-conforming items by attributes can be used. Sampling should be done considering the no. and nature of parameters to be assessed. Attribute sampling plan can be used when evaluating isolated lots. Variable method can be used if less no. of parameters is to be assessed. Sampling plan for lots moving in international trade are to be selected by attributes indexed by limiting quality level.

Sampling plan of honey sampling

- Consignments for customs clearance – Sampling from barrels or drums.
- One sample is usually taken as representing the goods covered by the same customs declaration.
- Additional aggregate samples should be created from consignments containing different products or lots.

1.3 Honey Sample Collection Instructions

This instruction will be used for sampling from collection area or on site (from hive).

1. Collect the honey sample at the time of your pre-winter (on site) or at room temperature at receiving area to meet the sample quality.
2. Collect a representative sample: If honey is collected from the same drum or only for one drum take from take a representative sample from three equal depth using StirWar ViscoThif. Collecting honey from a different drum or hive will prevent us

from identifying meaningful associations between the number of mites and biomarkers in the honey.

3. Using the Hive Science app, scan the barcode on the honey sample collection tube and StirWar ViscoThif for taking sample of honey in drum/container.
4. Using your hive tool, create a small V-shaped groove in comb containing sealed honey cells. The groove should be about 2-3 inches in length, and its point should face the bottom of the frame. The honey will run to the bottom of the V-shaped groove for collection into the tube. Collection of small amounts of honey in this way will not adversely affect your bees. The bees will quickly repair the comb.
5. Collect dripping honey directly into the pre-labeled, black collection tube until it is nearly full.
6. Please DO NOT mix the honey sample with any other liquids or add anything else to the honey.
7. Cap the sample securely.
8. Place the collection tube inside the Whirl-Pak plastic bag so the tube is lying flat across the bottom. Squeeze the air out of the bag and roll the top down until it touches the collection tube. Then, fold the wire tabs over to seal the bag closed.

Self-Check – 1	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.

Test I: Short Answer Questions

1. What is the base of collecting sample? (2 points)
2. Discuss the 4 types of sampling procedure (8 points)
3. Define and discuss activities performed under sampling procedure and sampling plan (8 points)

Note: Satisfactory rating – 18 points Unsatisfactory - below 18 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

Information Sheet 2- Preparing and handling samples

Sampling involves collecting, holding, sealing, storing and delivering the beeswax and honey samples to the laboratory in the manner that will reflect the condition or state prevailing at the time it is sampled. Beeswax and honey samples must be prepared, handled and dispatched in the manner that prevents change of identity, breakage or spoilage

2.1 Sampling guidelines for preparation and handling

- Use containers that are clean, dry, leak proof, wide mouth, sterile, air tight and of a size suitable for submission.
- Plastic or glass jar containers that are leak proof may be used for honey.
- All samples packed for dispatch must be secured with shock absorbing materials to protect them from damage.
- Containers should be wrapped heavily in paper and cushioning material for dispatch.
- In order to maintain integrity, packages containing beeswax and/or honey samples should be secured or sealed to prove their authenticity i.e. to ensure they have not been tampered with or changed, on transit to the laboratory
- Sample size should range between 250gm to 500gm depending on number of parameters for analysis.
- Samples will be submitted in three portions.
- Each part to be marked and sealed or secured in the manner permitted by its nature.
- The owner or vendor will be allowed to retain one portion.
- The second portion of the sample will be sent to the laboratory for analysis and the authorized officer can retain the third sample for future comparisons.
- Dealers of bee products are responsible for submission of samples to the authorized laboratories.
- Mark each unit of beeswax and/or honey sample with numbers.

- Every sub-sample must be marked with a sub-number. If necessary, correlate this number with the manufacturers/processors code number, if there is any.
- For each honey sample collected Authorized Officer (Beekeeping Authorized Officer) should write a brief report for use by the laboratory and other interested parties. The report should contain the required information on the label of the sample.

2.2 Sample Preparation

The preparation varies depending on the nature of sample, Primary sample/Composite sample or Final sample.

Primary Samples

A primary sample is the ‘portion of product’ collected from a lot during the first stage of the sampling process, and will normally be in the form of an item (if collected from a lot of pre-packed products) or of an increment (if collected from a bulk lot). (However, an ‘increment’ may be considered to be an ‘item’ if measurements are made on individual increments.) As far as it is practicable, primary samples should be taken throughout the lot and departures from this requirement should be recorded.

Sufficient primary samples of similar size should be collected to facilitate laboratory analysis. In the course of taking the primary samples (items or increments), and in all subsequent procedures, precautions must be taken to maintain sample integrity (i.e., to avoid contamination of the samples or any other changes which would adversely affect the amount of residues or the analytical determinations, or make the laboratory sample not representative of the composite sample from the lot).

Composite Sample

When required by the sampling plan, a composite sample is produced by carefully mixing the primary samples (items) from a lot of pre-packaged products; or by carefully mixing the primary samples (increments) from a bulk (not pre-packaged) lot.

Except for economical reasons, this sampling technique is not to be recommended given the loss of information on sample-to-sample variation due to the combination of primary samples.

Final Sample

The bulk or bulked sample should, if possible, constitute the final sample and be submitted to the laboratory for analysis. If the bulk/bulked sample is too large, the final sample may be prepared from it by a suitable method of reduction. In this process, however, individual items must not be cut or divided.

2.3 Preparation of honey samples for analysis

Honey, as a natural product, is a pure food source that is good for our health. However, the widespread use of crop protection agents, antibiotics and other such products mean that honey may contain substances that have an adverse impact on its quality or which can even be a potential health risk for humans. Honey is therefore subject to a wide range of analyses for quality assurance purposes and to protect consumers. Despite a large number of parameters that are included in the analyses, the initial treatment of the honey is generally the same.



Figure : Sampled honey can have different consistency and colour

Sample preparation of honey consider the following activities:

- The honey samples are taken from their containers and divided into aliquots.

- Extraction is then carried out and the extracts sent for analysis.
- Laboratory centrifuges are used during the extraction procedure.
- A solvent is added to the sample and the substance to be detected enters the solvent and is separated from the other constituents of the sample through the centrifugation procedure.
- The supernatant is removed by pipette and analyzed.

2.4 Handling Sample

Sample collected as part of the original sampling process and reserved for future testing. The size of a retention sample should be sufficient to allow for at least two confirmatory analyses. In some cases statutory regulations may require one or more retention samples, each of which should be separately identified, packaged and sealed. Container used to store a sample should not interact with the sampled material nor allow contamination. It should also protect the sample from light, air and moisture, as required by the storage directions for the food product or related material sampled.

As a general rule the container should be sealed and preferably tamper-evident. Liquid samples should be transported in suitable bottles closed by screw tops with inert liners that provide a good vapor-proof (moisture-proof) seal for the contents. Suitable screw-top jars in exceptional cases only should be used for solid or semi-solid pharmaceutical products. Packaging materials similar to those in which the bulk is supplied should be used for long-term storage.

Self-Check – 2	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.

Test I: Short Answer Questions

1. What are the three types of sample preparation? (3 points)
2. Discuss the retention of sample (2 points)
3. Mention at least ten of sampling guidelines for preparation and handling (10 points)

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

Information Sheet 3- Applying sampling techniques

There are several different sampling techniques available, and they can be subdivided into two groups: probability sampling and non-probability sampling. In probability (random) sampling, you start with a complete sampling frame of all eligible individuals from which you select your sample. In this way, all eligible individuals have a chance of being chosen for the sample, and you will be more able to generalize the results from your study. Probability sampling methods tend to be more time-consuming and expensive than non-probability sampling. In non-probability (non-random) sampling, you do not start with a complete sampling frame, so some individuals have no chance of being selected. Consequently, you cannot estimate the effect of sampling error and there is a significant risk of ending up with a non-representative sample which produces non-generalizable results. However, non-probability sampling methods tend to be cheaper and more convenient, and they are useful for exploratory research and hypothesis generation.

Sampling technique is chosen one of the following techniques such as sub-sampling or random or systematic sampling. However, sampling should be random and without prior intimation to the food business operator.

Random Sampling Techniques

Samples should be taken in the right manner to maintain the integrity and homogeneity of the sample. Sample can be taken while conducting inspection of the premises. Prior notice is not mandatory but receipt to be given to the owner, in-charge, operator on completion of inspection and prior to leaving the premises.

There are 4 main types of random sampling technique can be identified.

- **The simple random sampling:** for the simple random sampling method, any sample from the population has an equal chance of being drawn, that is, every sample has the same probability of being selected.

- **Stratified random sampling:** the stratified random sampling method is based on the fact that sometimes the entire population might embrace certain number of distinct samples which would be divided into subpopulations.
- **Systematic sampling:** when the population can be ordered in some scheme and the samples are drawn at regular intervals through that ordered list, then the sampling method is called systematic sampling. For this method and to start the sampling is convenient to select the first sample randomly and then draw the next samples at regular fixed intervals till the end of the list. In case of random sampling the items are collected in such a way that all possible combinations have same probability of being collected.
- **Clustered sampling:** In a clustered sample, subgroups of the population are used as the sampling unit, rather than individuals. The population is divided into subgroups, known as clusters, which are randomly selected to be included in the study. Clusters are usually already defined, for example individual GP practices or towns could be identified as clusters. In single-stage cluster sampling, all members of the chosen clusters are then included in the study. In two-stage cluster sampling, a selection of individuals from each cluster is then randomly selected for inclusion. Clustering should be taken into account in the analysis.

Self-Check – 3	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.

Test I: Short Answer Questions

1. Discuss the four types of random sampling technique (6 points)

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

Information Sheet 4- Taking representative sample ratio

Representative sample taking is one of the sampling procedures (the fourth step). A representative statistical sampling strategy should be made for batches and lots based on the volume of material available on-site. Sample ratio is referring to representative samples size (number) of a population and depends on the size of the population.

Representative sample

The representative sampling is a procedure used for drawing or forming a representative sample. The requirements of this clause shall be, if needed, completed by procedures (such as how to collect and to prepare a sample). Random sampling involves the collection of n items from a lot of N items in such a way that all possible combinations of n items have the same probability of being collected.

Sample obtained according to a sampling procedure designed to ensure that the different parts of a batch or the different properties of a non-uniform material are proportionately represented.

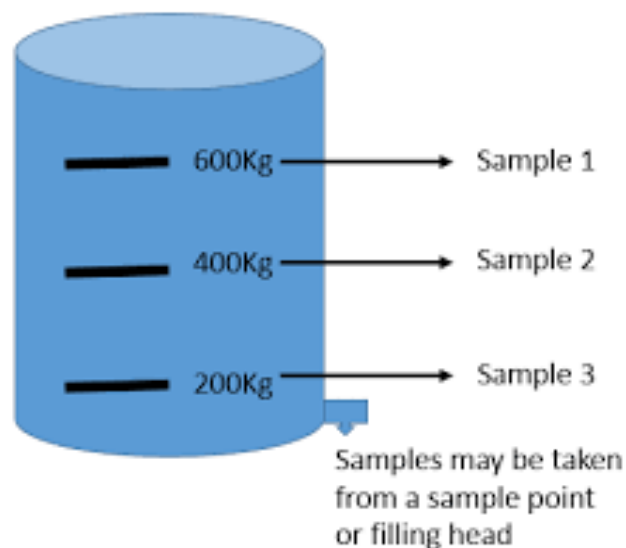


Figure : Taking representative sample from honey in a drum

From the above figure, the honey in drum represents N items and sample 1, sample 2 and sample 3 are represent n items from a lot of N items.



Figure :Taking representative sample using StirWar ViscoThif



Figure : Samples taken by Piston-tube sampler into rectangular plastic bottles, size 500 ml with leak-proof or air tight closure

The sample taking is straightforward but you must follow the following rules:

- each sample must be at least 150 mls
- each sample must be retained for at least 12 months
- samples must be stored in clean containers
- each sample must be labelled with information including:
 - ✓ Sample number;
 - ✓ date of extraction
 - ✓ Product name;

- ✓ Type of the Products;
- ✓ Indicate analysis needed where possible;
- ✓ Owner's codes;
- ✓ Owner's name and address;
- ✓ apiary identification;
- ✓ floral source (code);
- ✓ batch number (if relevant);
- ✓ Size of lot from which sampled;
- ✓ Date submitted to the lab;
- ✓ Description of sample and method of collection (number and size of units);
- ✓ Collectors Identification;
- ✓ Name of the sampler or authorized officer,
- ✓ Identification number of the drum from which the sample has been taken.



Figure : Representative sample prepared for testing

A representative sample is essential when pathogens or toxins are sparsely distributed within the food or when disposal of a food shipment depends on the demonstrated bacterial content in relation to a legal standard.

Self-Check –4	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.

Test I: Short Answer Questions

1. What is representative sampling? (2 points)
2. What are rules used for sample taking? (10 points)

Note: Satisfactory rating - 12 points Unsatisfactory - below 12 points

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

Information Sheet 5- Identifying and reporting defects

Sample should be dispatched in a manner that does not alter the character of the product. Samples should be dispatched to the Laboratory analysis as soon as practically possible to avoid any discrepancies in testing.

Defects can occur at preparation, sample taking, sample preparation, sample dispatching. There are standard on each sampling procedures which prevent sample from defects.

- **Employment of food safety:** Sampling should be performed by persons trained in the techniques of sample collection.
- **Time for sample analysis and reporting by the LAB:** Sample Analysis should be considered as per the urgency basis. Minimum time should be taken to analyze and report the findings of the disputed sample. In either case the sample should be analyzed and reported within 7 - 14 working days from the date of receipt of samples by the Public Analyst. Sample reporting should report the results in terms of ***conforms/does not confirm***.
- **Suitable containers:** The laboratory sample must be placed in a clean, inert container which provides secure protection from contamination, damage and leakage. The container should be sealed, the sampling record must be attached and the sample delivered to the laboratory as soon as practicable. Containers liquid/semi-solid products should preferably be of inert materials, glass or plastic. The containers should preferably be of appropriate size, capable of air-tight closure and preferably dark-coloured so as to prevent light-based degradation. Samples to be taken for microbial analysis should be collected in sterile containers.
- **Sample preservation/storage during transport:** The storage condition will be determined by the temperature control required for individual products Storage of non-perishables should maintain the originality of the sample as is during the sampling conditions. Transportation should be done at temperatures not more than 4⁰C. Care should be taken to provide maximum protection from pilferage.

- **Define time:** For microbiological samples analysis should initiate within 24 hours of sample being drawn. For chemical tests analysis has to be initiated within 48 to 72 hours. Samples should be transported and stored under conditions which inhibit changes in microbial numbers and be delivered to the laboratory without undue delay. The final part to be submitted to the analyst should be transmitted as soon as practicable after sampling.

Sampling Report

The sampling report should include:

- the reason for sampling
- the origin of sample
- the sampling method
- the date and place of sampling
- any additional information like transport time and conditions

Any deviation/defect/ from the specified sampling procedure to be reflected should be found in report.

Defects to be Report

- In the event of any argument over the composition or other supposed defect in the sample, as decided by the court, or by mutual agreement of the authorized officer and the owner of the food.
- Contamination may occur due to the absences of the cleaning sampling equipment, using equipments with wet and foreign odors. Using sharp objects should be avoided to prevent the possibility of damage to the surface of the equipment.
- If samples are improperly collected and mishandled or are not representative of the sampled lot, the laboratory results will be meaningless. Because interpretations about a large consignment of food are based on a relatively small sample of the lot, established sampling procedures must be applied uniformly.
- Use of a propane torch or dipping the instrument in alcohol and igniting is dangerous and may be inadequate for sterilizing equipment. Instead of this Sterilize one-piece stainless steel spoons, forceps, spatulas, and scissors in an autoclave or dry-heat oven.

- Penetrating of ink on the plastic sample container due to the use of a felt pen.
- Insufficient sample, unopened sample and non-homogenous sample may occur due to the inappropriate representative sample taking sample preparation.

Self-Check – 5	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.

Test I: Short Answer Questions

1. Where defects can occur in sampling procedure? (4 points)
2. Mention the standards on each sampling procedures which prevent defects of sample (5 points)
3. What are contents include in sampling report? (6 points)

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

Information Sheet 6- Recording sample information as workplace information

6.1 Workplace information

Sampling should be performed in an area or booth designed for and dedicated to this purpose, although this will not be possible where samples are required to be taken from a production line (e.g. in-process control samples) where possible. The area in which the sample was taken should be recorded in the sampling record and a sequential log should be kept of all materials sampled in each area. Maintenance of sample information may include:

- use of appropriate personal protective clothing,
- clean sampling tools and containers (sterilized tools/ containers for aseptic sampling),
- temperature control and addition of preservatives as required

Workplace information used to record information include

- Standard Operating Procedures (SOPs)
- Manufacturers specifications
- production schedules and instructions,
- manufacturers' advice and sampling plans
- company policies and procedures
- regulatory and licensing requirements
- legislative requirements and industrial awards and agreements

6.2 Sampling Record

Written record of the sampling operations carried out on a particular material for a defined purpose. The sampling record should contain the batch number, date and place of sampling, reference to the sampling protocol used, and a description of the containers and of the materials sampled, notes on possible abnormalities, together with any other relevant observations, and the name and signature of the inspector.

Principles of record keeping practices

1. Complete records in **real time** whenever possible. Recording after-the-fact (from memory) can often lead to errors.
2. Have records that are as accurate as possible. Unconfirmed diagnosis or suspicion of a pest should be identified as such.
3. Be aware that errors in entering information should be struck-through, dated, and initialed, rather than erased or otherwise obscured.
4. Know that dated and properly identified digital camera images are a useful supplement to written records.
5. File all documents such as receipts, invoices, diagnostic reports, and permits in a secure location.

6.3 Sample collection form

Serial number:.....
Name of location/place where sample was taken:
Address (with telephone and fax number, if applicable).....
.....
Date of sampling:

Names of people who took samples:

1.
2.

Product name of the sample:

Name of (active) starting material (INN, generic or scientific name) with dosage strength:.....

Dosage form (tablet, capsule, etc.):

Batch/lot number: Date of manufacturing:

Expiry date: Registration or licence number (if applicable):

Name of the manufacturer:

Number of sample unit taken (tablet, capsule, etc.: at least 20 but not more than 30 units):

Brief physical/visual description of sample:
.....
.....

Signature of person (s)

Signature of representative of the taking samples establishment where sample(s) was taken (optional) 1.

2.

Self-Check –6	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.

Test I: Short Answer Questions

1. Mention the three type of information to be maintained in sampling? (3 points)
2. Mention workplace information used to record information? (7 points)
3. Define sample recording (2 points)
4. What are the principles of record keeping practices? (5 points)

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

Information Sheet 7- Workplace housekeeping standards

Workplace housekeeping standard applied for conducting sampling procedure of bee product processing is consider standards of cleaning in the food and beverage processing industry. For sophisticated and safety-conscious food factories, using traditional tools such as rags, scrubbing brushes and hoses are no longer an ideal fit. The following are best practice cleaning methods to follow for the food and beverage processing industry.

1. Wet vs dry cleaning

Traditional cleaning methods include hosing down chemical, scraps, oils and grease. The main flaw with this method is that it doesn't agitate the surface, which is fundamental to getting deep within the surface, including any pores and crevices. A process that combines a 4-in-1 approach of washing, scrubbing, steaming and drying food processing equipment and surfaces is ideal. These steps allow for not only sterilization (if steam temperature is high enough) but a mechanical agitation, which allows for the removal of food scraps, dirt and grime.

When looking at a steam cleaning processes, it's important that 'dry' steam is used. The dry component significantly reduces the risk of residue build-up or the occurrence of moist/wet floors, which can lead to slips and falls. Another critical factor when it comes to wet vs dry cleaning is that some processing equipment shouldn't get wet. Wet equipment can lead to machinery faults and rust.

2) Automated and interval cleaning

Traditionally, cleaning could only be done either before production or after, and if it occurred during production hours, machines would need to be turned off for the cleaning to occur.

Inline cleaning systems are modern methods that allow for food and beverage processing equipment to be steamed, vacuumed and removed of any waste in one process, without the need to stop and swap equipment or tools. This greatly reduces the

risk of contamination further down the production line. Surfaces receive a deep clean while production is occurring rather than a wipe down at the end. It also reduces resources, labor and downtime.

Validation of cleaning processes

An increase in regular ATP testing is becoming a standard in many food and beverage processing factories. ATP testing allows for microorganisms to be detected and subsequently prevent contamination. Using invisible or fluorescent lights is becoming a popular auditing tool in industries where contamination prevention or infection is paramount. Some microorganisms can be detected under fluorescent light.

A cleaning audit can also be taken one step further when using florescent tools. Areas to be cleaned in a factory can be marked with an 'invisible marker'. Once cleaning has occurred, a fluorescent torch can be used to see if the invisible markers are still present. If invisible marks are still present, then the surface has not been adequately cleaned.

Stricter infection control procedures

Implementing procedures to 'safeguard' a food and beverage processing environment is almost becoming just as important as the cleaning itself. An example of a safeguarding process can be seen in the use of ultraviolet (UV) light methods. UV light continues to protect and sterilise an environment post cleaning. If a surface is contaminated during production hours, this leaves 12 hours or more for microbes to grow while the factory is closed for the day or in non-production hours. UV light will reduce the risk of this contamination from occurring by acting as a 'night watch' for bacteria during production downtime.

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.

Test I: Short Answer Questions

1. What the standard housekeeping for bee product processing? (2 points)
2. Discuss the two best practice cleaning methods to follow for the food and beverage processing industry (4 points)
3. Discuss validation of cleaning processes (2 points)
4. Discuss the stricter infection control procedures (2 points)

Note: Satisfactory rating - 10 points Unsatisfactory - below 10 points

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

Operation Sheet 1- Collecting Sample	
Operation Title: Collecting Sample of Honey	
Purpose	To acquire knowledge, skill and attitude by performing collecting sample of honey from receiving area /honey in drum/
Equipment, tools and materials	Supplies and equipment needed or useful for sample collecting of honey include: <ul style="list-style-type: none"> • StirWar VisicoThif , sample container (jar), Thermometer, marker (for labeling), measuring tape • Honey in drum/ bucket & distilled water
Conditions or situations for the operations	<ul style="list-style-type: none"> • Services, equipment's and materials should be available • Appropriate working area for receiving and collecting sample.
Procedures	<ol style="list-style-type: none"> 1. Wear the appropriate PPE 2. Identify the availability of service, all equipments and materials 3. Measure the length of the drum/container which contain honey and make a mark on the three equal length 4. Collect representative sample using the appropriate sampling equipment 5. Transfer the sample in to jar and cape it properly 6. Labelling with the required information 7. Control your sample from any contamination 8. Clean all equipments used and working area 9. Record and report to the appropriate personnel
Precautions	<ul style="list-style-type: none"> • Care should be taken while collecting sample (free from contamination) • Using the appropriate sample collecting equipment
Quality criteria	<ul style="list-style-type: none"> • Sample representatives • Handling temperature • Accuracy of samples and sampling • The quality of report

Operation Sheet 2- Collecting Sample	
Operation Title: Collecting Sample from Combed Honey	
Purpose	To acquire knowledge, skill and attitude by performing collecting sample of honey from combed honey
Equipment, tools and materials	Supplies and equipment needed or useful for sample collecting of honey include: <ul style="list-style-type: none"> • Whirl-Pak plastic bag, sample collecting tube, Thermometer, marker (for labeling), and other hive tool • Combed Honey
Conditions or situations for the operations	<ul style="list-style-type: none"> • Services, equipment's and materials should be available • Appropriate sample collecting area
Procedures	<ol style="list-style-type: none"> 1. Wear the appropriate PPE 2. Identify the availability of service, all equipments and materials 3. Make V-shape groove in comb containing sealed honey cells 4. Collect honey in to sample bag 5. Cap the sample 6. Place the collection tube inside the Whirl-Pak plastic bag 7. Squeeze the air out of the bag and roll the top down until it touches the collecting tube 8. Fold the wire tabs over to seal the bag closed 9. Labelling with the required information 10. Clean all equipments used and working area 11. Record and report to the appropriate personnel
Precautions	<ul style="list-style-type: none"> • Care should be taken while collecting sample (free from contamination) • Using the appropriate sample collecting equipment
Quality criteria	<ul style="list-style-type: none"> • Sample representatives • Handling temperature • Accuracy of samples and sampling • The quality of report

LAP TEST	Performance Test
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Name..... ID.....
Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hour. The project is expected from each student to do it.

Project title: Collecting Sample

Task-1:- performing collecting sample of honey from receiving area /honey in drum/

Task-2:- performing collecting sample of honey from honey with comb

List of Reference Materials

- 1) WHO, 2007, Quality assurance of pharmaceuticals, A compendium of guidelines and related materials, Volume 2, 2nd updated edition Good manufacturing practices and inspection.
- 2) FSSAI, 2016, Manual on General Guidelines on Sampling, Food Safety and Standards Authority of India Ministry of Health and Family Welfare Government of India New Delhi.
- 3) Yeshitila Eshete, 2018, Beehive Product Processing and Quality Assurance Guideline, Honey and Bees wax Product Processing and Research Department, Ministry of Industry, Ethiopian Meat, Dairy and Industry Development Institute (EMDIDI).
- 4) Helen Barratt and Saran Shantikumar, 2018, Methods of sampling from a population.

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The trainers who developed the Learning Guide

No	Name	Level	Educational background	Region	E-mail
1.	Alemayehu Tolera Gemeda	A	Animal production	Oromia	toleraalex@gmail.com
2.	Ayele Mengesha Mosisa	A	Animal nutrition	Oromia	ayelemengesha@ymail.com
3.	Kebebush Tessema Beyene	A	Food science and post-harvest technology	Sidama	Kebebush04@gmail.com

