Bee product processing Level-II

Based on October 2020, Version 2 Occupational standards

Module Title: - Applying bee products handling and storage

LG Code: IND BPP2 M07 0920 LO (1-2) LG (20-21)

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United Nations
Educational, Scientific and
Cultural Organization

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LG #20	LO #1- Sample beeswax for testing

Instruction sheet

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

- Taking samples of beeswax
- Preparing samples for dispatch

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:

- take samples of beeswax
- prepare samples for dispatch

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- Taking samples of beeswax

1.1. Introduction

Beeswax is a natural animal product produced by various species of honeybees. The wax is secreted by four pairs of glands located on the ventral side of the abdomen of worker bees. Worker bees make regular hexagonal wax cells and capping in the hive to store new honey. Beeswax is the creamy colored substance used by bees to build the comb that forms the structure of their nest. Very pure beeswax is white, but the presence of pollen and other substances cause it to become yellow.

Beeswax is a true wax secreted by four pairs of wax glands on the ventral side of the abdomen of the worker honey bees that are between age of 12 to 18 days provided that: -

- They are well fed both sugar and protein (nectar and pollen or pollen substitutes
- An elevated temperature of about 360c

The Wax glands are composed of special cells derived from hypodermis. Wax secretion appears to be an involuntary action carried out by the bees.

Honey Comb

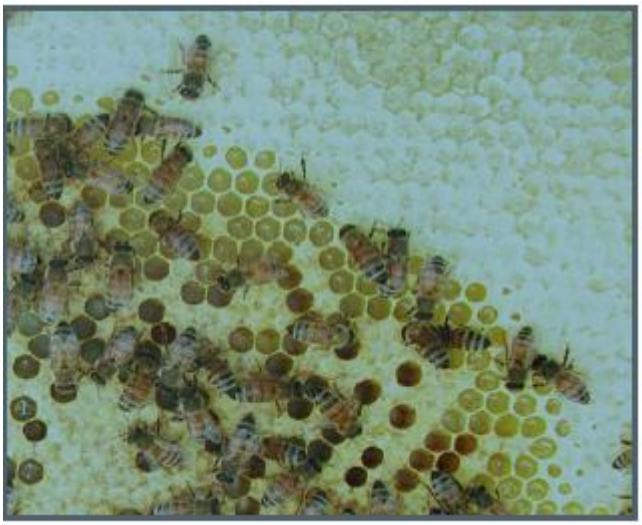

Figure Wax production in the hive

The comb provides the structure of the bees' home, used for all the different storage functions needed in a bees' nest: to store honey, to store pollen, as a place to deposit eggs and for development of the young bees. The comb has a hexagonal cross-section. This shape is created by the worker using her antennae to maintain the shape of each cell during its construction. The shape and dimensions of the cells in comb optimize the ratio of size to strength of the materials used in its construction. The six sided cells and the pyramidal-shaped bottom of the cell also represent a highly efficient use of material with no wax being wasted

Pure waxes from different species of stingless bees are also very different from the other types of beeswax. It is much darker in color – dark brown, and when it is warmed, it stretches without breaking. It is also sticky and much more difficult to break than beeswax from *Apis mellifera*

1.2. How to collect beeswax

The beekeeper gets the beeswax from the honeycombs having first extracted the honey. Beeswax can also be got from old empty combs. It can then be melted and sieved and sold as a raw commodity. However most beekeepers do not know the benefits of beeswax and throw combs away. In Ethiopia most bees wax were collected from the local brewery (Tej) making house.

1.3. Characteristics of beeswax

Beeswax contains the following characteristics

(a) Specific gravity

Beeswax has a low specific gravity compared with water therefore it floats in water. Any beeswax sample, which sinks in water, indicates that it has been contaminated or adulterated.

(b) Melting point

Beeswax may exist in two forms; solid or liquid. Beeswax has higher melting point than paraffin wax and low melting point than other waxes of plant origin

(c) Acid number

Acid number is the number of milligrams of pure Potassium Hydroxide (KOH) required to neutralize completely the free fatty acids in one gram of wax. Thus an average sample of beeswax with an acid number of 20 needed 20mg of KOH per gm of wax to neutralize the acid content. Determination of acid number of beeswax can tell whether beeswax sample has been adulterated.

(d) Saponification value

Saponification value is the number of milligrams of Potassium Hydroxide required to neutralize the acids resulting from the complete hydrolysis of 1gm of oil or fat. High Saponification value indicates adulteration with vegetable oils.

(e) Iodine value

Iodine value is defined as the number of milligrams of iodine that will combine with 100gm of oil or fat to give the degree of un saturation of the acids in the substance. Saturated fatty acids absorb no iodine, thus the iodine value is a measure of proportion of unsaturated fatty acids present in waxes. The higher the iodine number indicates adulteration.

1.4. Physical properties of Beeswax

- Brittle at low temperature
- Malleable at high temperature (>32^{0}c)
- Normally found at solid state
- Melting point at 64 (Range 62c -66^{0}c)
- It does not boil but decomposes at 120 degree
- Its specific gravity is 0.96, which means that it is lighter than water and will flat on Water and on honey

1.5. Taking samples of beeswax

Sampling is the act of selecting a certain portion, number of containers or product units from a particular lot of the beeswax. They should be with the recommended Moisture content, should be free from insects like wax moth attack and free from dust particles and other foreign matter and also concede with some organoleptic tests. A sample refers to a smaller, manageable version of a larger group. It is a subset containing the characteristics

of a larger population. Samples are used in statistical testing when population sizes are too large for the test to include all possible members or observations

Samples are normally sent to the laboratory for analytical purposes. The condition of the same arriving in the laboratory shall reflect conditions at the time of sampling. The results obtained from the laboratory will be the basis of removal of the product from the market, legal or administrative action to the producer, seller, distributor, exporter and consumer. Therefore in order to achieve the anticipated results, sampling should be drawn according to the laid down procedures

1.6. Important points to consider during sampling

- No. of batches/ lot: A representative statistical sampling strategy should be made for batches and lots based on the volume of material available on-site.
- No. of batches or lot are decided as per the Investigations Operations Manual Sample Plan.
- Each lot that is to be examined must be clearly defined. In case of random sampling the items are collected in such a way that all possible combinations have same probability of being collected. If the lot is heterogeneous, stratified sampling may be a solution.
- Protocol for labelling and sealing: Labelling and sealing should be appropriate to maintain integrity and traceability of the sample. The identity of the sample should be evident from the reference stated on the drawn sample container.
- The contained final parts should each be secured with a tamper evident seal, and labelled specifying the name of the food, the name of the officer, the name of the authority, the place, date and time of sampling and an identification number. Where necessary, it should then be placed in a second container, such as a plastic bag, which should be sealed in such a way as to ensure that the sample cannot be tampered with. A copy of the food label if available and any other relevant details should be submitted to the public analyst with a final part.
- Sealing the edges: All the samples should be sealed immediately post sampling. A tamper evident seal should be used like wax, adhesives etc.
- Thread: Maybe used to identify any tampering taking place.

- Seal of the owner Required
- Define category of analysis: The category of analysis for foods should be done according to the requirement for regulatory or monitoring purpose. Category of analysis to be chosen should be done in sync with the Public Analyst. etc
  i. Chemical
  ii. Microbiological
  iii. Physical
  iv. Sensory

I. Chemical which includes:

- gravimetric
- colorimetric
- Electrical Conductivity (EC) and pH
- specific ions using dipsticks and kits
- nutrients (e.g. nitrates and orthophosphates) using basic kits
- ashes, including sulphated ashes

II. **Microbiological which includes**:

- pH,Oxygen Reduction Potential (ORP), Dissolved Oxygen (DO) and (EC)
- E coli using test kits
- surface hygiene/presence of microbes

III. Physical tests

- density, specific gravity and compacted density
- moisture content and water activity
- particle size, particle shape and size distribution

IV. Sensory

- visual/optical tests of appearance, colour, texture, identity, turbidity, refractive index (alcohol content and Baume/Brix)

1.6. Sampling techniques

There are different techniques of sampling. Some of them may include:

- Sub-sampling – a smaller portion of an original sample, created by trimming, subdividing, splitting or discrete collection of the original sample.
- random or systematic sampling

Systematic sampling is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point but with a fixed, periodic interval. This interval, called the sampling interval, is calculated by dividing the population size by the desired sample size.

Sample preparation method and Laboratory sampling procedures involve either:

- Coning and Quartering; or
- Riffling Method.

1. Coning and Quartering for sample preparation techniques/method

The method which is used for sampling large quantities of material say 20kg, consists of pouring or forming the material into a conical heap upon a solid surface (e.g. Moulded bees wax) and relying on radial symmetry to give four quarters when the heap is divided by a cross. Two opposite corners are taken as the sample the other two set aside. The portions chosen may be further reduced by a repetition of the process, until the required size of sample is obtained.

Example. Operator skill defines the accuracy of this form of sampling.

Procedure of Coning and Quartering an approximate 50kg sample

1. Starting sample weight (approximately 50 kg)
2. Set up adjacent to work area.
3. Clean steel plate.
4. Spread out sample and mix thoroughly into conical heap.
5. Quarter.
6. Repeat quartering.
7. Bag sample – replace container to storage with excess sample.

It is expected that steps 1 – 6 should take less than 30 minutes.

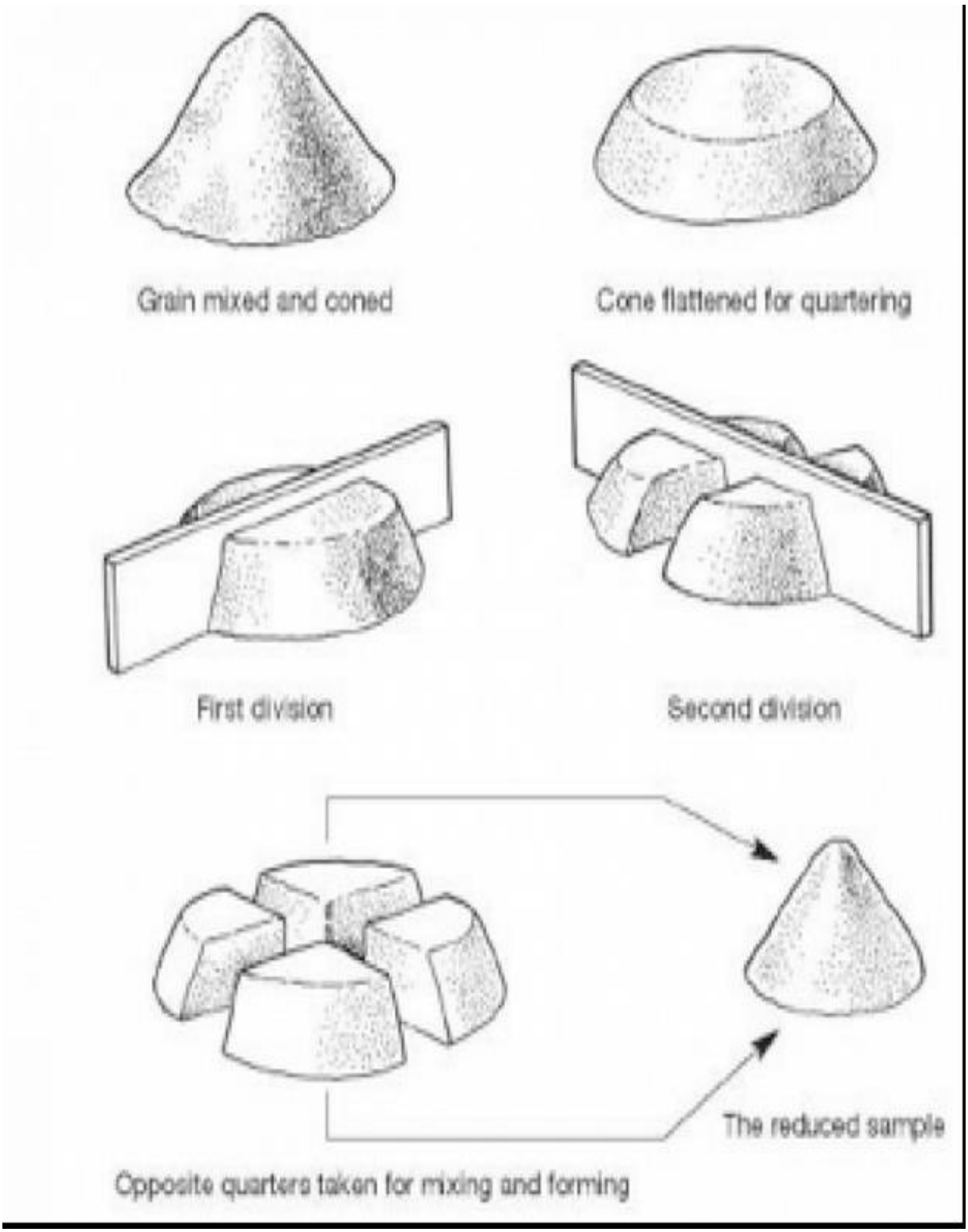

Figure **Bees wax sampling by Coning and Quartering**

Same of equipments used in bee product sampling are as follows

Figure **Digital thermometer**

Figure : Metal containers

Figure : Glass bottles

Figure **Polypropylene plastic bottles**

Figure Spiral screw sampler

Figure **Hand-drill sampler**

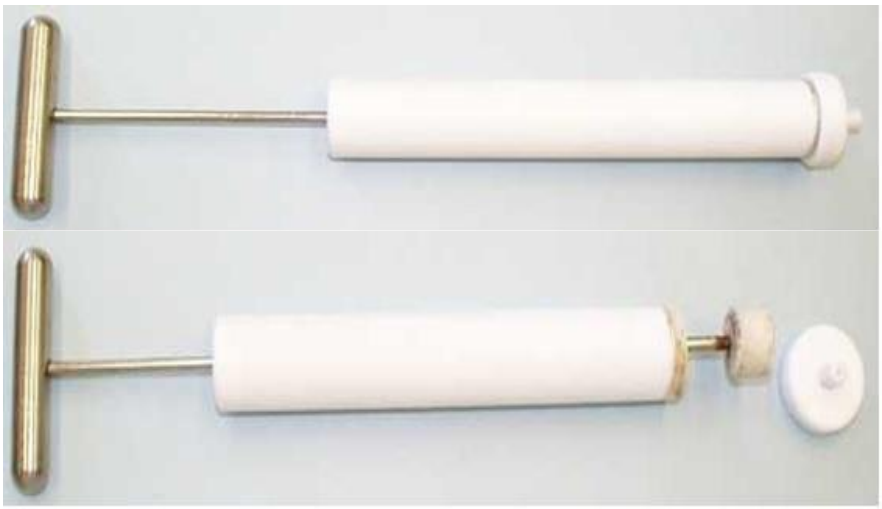

Figure Piston-tube sampler

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List down the physical properties of wax (4pts)
2. What is sample and sampling (6pts).
3. Mention the sources of wax (4pts)

Note: **Satisfactory rating – 10 points** **Unsaisfactory - below 10 points**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

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Information Sheet 2- Preparing samples for dispatch

2.1. Sample preparation, handling and dispatch

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

Sampling guidelines

- 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

Table 2. Sample Size selected for testing

Lot size(Drums)	Number of containers to be drawn	
	500g and above	Above 500g
Up to 25	3	6
26 -150	4	9
151- 500	5	12
501 and above	7	15

- 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 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.

Sample taken should be divided into 4 parts immediately. There are exceptions where the division of sample might not be possible:-

- Sample is insufficient
- Sample is unopened
- Sample is non-homogenous

2.2. Each sample must be labeled with information including:

- Sample number;
- Date collected;
- Product name;
- Type of the Products;
- Indicate analysis needed where possible;
- Owner's codes;
- Owner's name and address;
- 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.
- Each sample must be at least 150 ml.
- Each sample must be retained for at least 12 months
- Samples must be stored in clean containers

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention at least four sampling guide line (4pts)
2. Mention where can we submit the three portions of samples (3pts)
3. Mention the information included in labeling of the sample (7pts)

Note: **Satisfactory rating – 14 points** **Unsatisfactory - below 14 points**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

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Operation sheet -1	Sample preparation, handling and dispatch

Operation title: Techniques to take sample for bees wax

Purpose	To acquire the trainees with knowledge, skill on how **to take sample for bees wax**
Equipment ,tools and materials	• Wax of different sources, screw drive , bottles(glass or plastic, stainless steel container, thermometer, log sheet, Polypropylene plastic bottles Spiral screw sampler, Hand-drill sampler, Piston-tube sampler weighing balance,and all necessary equipments and tools needed for the specified work accordingly
Conditions or situations for the operations	• All tools, equipment's and materials used in bee wax sampling should be available on time when required. • Store for storage of product, workshop to prepare/ process bee products damaged or maintained equipment and machines.
Procedures/ steps	1. prepare the necessary PPE 2. prepare appropriate materials for sampling 3. take some portion of bees wax from different parts/ from mixed bees product 4. Pack/ seal it in a proper manner 5. Specify each packed sample 6. Take the prepared sample to lab for test/or dispatch 7. Keep record and prepare report to relevant persennol
Precautions	• Do not wear waxy contaminated PPE and other wearing • Care should be taken while sample taking equipment is not clean, free of bee venom • Care for inflammable materials (if wax is heated over required temp., honey is denatured) • Sanative balance should bee properly fitted and use wind barriers.
Quality criteria	• Did personal protective equipment worn while fitting • While setting for use re check or inspect the measuring materials are properly calibrated • Quality report

Operation sheet -2	Sample preparation by Coning and Quartering method

Operation title: Procedure of an approximate 50kg bees wax sample

Purpose	To acquire the trainees /operator skill defines the accuracy of this form of sampling.
Equipment ,tools and materials	• Wax of different sources, screw drive , bottles(glass or plastic, stainless steel container, thermometer, log sheet, Polypropylene plastic bottles Spiral screw sampler, Hand-drill sampler, Piston-tube sampler weighing balance,and all necessary equipments and tools needed for the specified work accordingly
Conditions or situations for the operations	• All tools, equipment's and materials used in bee wax sampling should be available on time when required. • Store for storage of product, workshop to prepare/ process bee products damaged or maintained equipment and machines.
Procedures/ steps	1. Prepare all protective equipments and use them properly 2. Starting sample weight (approximately 50 kg) 3. . Set up adjacent to work area. 4. Clean steel plate. 5. Spread out sample and mix thoroughly into conical heap. 6. . Quarter. 7. Repeat quartering. 8. Bag sample – replace container to storage with excess sample.
Precautions	• Do not wear waxy contaminated PPE and other wearing • Care should be taken while sample taking equipment is not clean, free of bee venom • Care for inflammable materials (if wax is heated over required temp., honey is denatured) • Sanative balance should bee properly fitted and use wind barriers.
Quality criteria	• It is expected that steps 2 – 6 should take less than 30 minutes • While setting for use re check or inspect the measuring materials are properly calibrated • Acurecy measurnment • Quality report

LAP Test	Practical demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 6 hours.

Task1. Perform Sample preparation, handling and dispatch

Task 2. Perform sampling

LG #21	LO # 2- Move Extracted wax into and out of storage

Instruction sheet

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

- Identifying handling and storage facility
- Selecting handling equipments
- Segregating extracted wax
- Minimizing pest infestation
- Moving extracted Wax
- Checking extracted beeswax
- Cleaning of storage and handling equipment
- Minimizing the effect of dusts

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 handling and storage facility
- select handling equipments
- segregate extracted wax
- minimize pest infestation
- move extracted Wax
- check extracted beeswax
- clean of storage and handling equipment
- minimize the effect of dusts

Learning Instructions:

Read the specific objectives of this Learning Guide.

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Information Sheet 1- Identifying handling and storage facility for bees wax

1.1. Handling of bees wax

Beeswax is antifungal and antibacterial, thus very hygienic. Pure honey and beeswax has no expiry date - it does not grow mould, does not rot and does not sour. If and only if, it is properly handled and stored.

Beeswax is a valuable product that can provide a worthwhile income in addition to honey. One kilogram of beeswax is worth more than one kilogram of honey. Unlike honey, beeswax is not a food product and is simpler to deal with - it does not require careful packaging which this simplifies storage and transport. Beeswax as an income generating resource is neglected in some areas of the tropics.

Some countries of Africa where fixed comb beekeeping is still the norm, for example, Ethiopia and Angola, have significant export of beeswax, while in others the trade is neglected and beeswax is thrown away. Worldwide, many honey hunters and beekeepers do not know that beeswax can be sold or used for locally made, high-value products. Knowledge about the value of beeswax and how to process it is often lacking. It is impossible to give statistics, but maybe only half of the world's production of beeswax comes on to the market, with the rest being thrown away and lost.

Pure waxes from different species of stingless bees are also very different from the other types of beeswax. It is much darker in color – dark brown, and when it is warmed, it stretches without breaking. It is also sticky and much more difficult to break than beeswax from Apis mellifera

The initiation in collecting, processing, storing and selling of beeswax by export companies is advantageous not only for the local honey wine making business, but also for all actors along the value chain including processors and exporters.

Figure **Extracted and purified wax samples**

1.2. Storage of beeswax

1. Wax blocks must be stored in sealed plastic, airtight containers and in a cool dry place.
2. Wax blocks should never be stored near pesticides or chemicals as the wax may absorb them.
3. Wax should be wrapped in plastic or newspaper in order to store it for long periods of time without damage. Wax can retain its quality and shape for hundreds of years.

For effective storage the materials use in this process should be handled properly.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the handling and storing facilities of beeswax (4pts)
2. Pure waxes from different species of stingless bees are also very different from the other types of beeswax. Explain it briefly. (4pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

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Information Sheet 2- Selecting handling equipments

2.1. Selecting handling equipment during transportation of processed wax

The size and type of equipment used depends on

- the size of the sample,
- the nature of the wax,
- the distance traveled,
- the weather condition,
- cleanness/ free from contaminants and etc.

This equipment includes but not limited to:

- containers (various sizes)
- Refractometer (used to measure moisture content of a product)
- Large containers used for larger size transport and storage
- a sheet of nylon mosquito mesh
- a plastic or polyethylene cover
- Wax grade sampling bags
- Sterile sample jars (various sizes)
- Sterile knives and spoons as necessary
- Thermometer (Calibrated) is among the selected equipment for handling.

2.2. Requirement for Premises & Equipment

- Are there adequate measures to protect wax against any contamination?
- Is the premise for storage of wax protected against vermin and have adequate separation?
- Are the surfaces of equipment that are intended to come into contact with wax (utensils, containers etc.) Washable and non toxic, and sufficient inert to preclude
- substances from being transferred to endanger human health or to bring about unacceptable change in the composition of food or deterioration of its organoleptic properties?
- Are the wax collection centers under supervision/controls of the unit to ensure the wholesomeness of the product?

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention at least five wax handling equipment during transportation of processed wax (5pts)
2. What is the importance of personal Hygiene and Health of Handlers in handling equipment (4pts)

Note: **Satisfactory rating – 9 points** **Unsatisfactory - below 9 points**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

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Information Sheet 3- Segregating extracted wax

Extracted wax should be segregated for ease of handling, storing and transportation. They are segregated according to:

- Available handling material,
- Sources of the wax
- Size of the wax to be handled
- The storage place and storage temperature, ventilation
- Duration of store
- The degree of purity
- The need of customer
- Company's sale and supply agreement
- The condition of wax eg. Semi or finished product, etc

Guidance

Records may be kept in a daily diary, logbook, record form or checklist

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention how segregation of extracted bees wax can be conducted (5pts)

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

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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Information Sheet 4- Minimizing pest infestation

4.1. Pest control

- Are adequate documented procedures in place to control pests?
- Whether bait map showing serially numbered bait stations provided?
- Are adequate procedures in place to prevent domestic animals from having access to places where wax is prepared, handled or stored?

Beeswax should only be stored in its rendered, clean form. Before rendering, it will quickly be attacked by wax moths, which are able to destroy large quantities of wax in short periods of time. Clean wax in large blocks is not attacked by wax moths. Storage should be in cool dry places and never in the same room with any kind of pesticide.

The Four Types of Stored Product Insects

There are actually many species of stored product insects, but they can be classified in four main categories based on their biology and habits:

1. External feeders: True to their name, these pests feed on the exterior of cereal (grain) and kernel products, gradually working their way inside products and packaging. Pests in this category include Indian meal moths and cigarette beetles.
2. Secondary feeders: These pests will consume almost anything without discrimination, typically product residues. They include the red flour beetle and sawtoothed grain beetle.
3. Scavengers: Typically feeding on debris in cracks and crevices, these pests consume moldy and damp food products. Among them are rusty grain beetles, flat and fungus beetles.
4. Internal feeders: Known for laying eggs in grain, pests in this category include Angoumois grain moths, granary weevils and lesser grain borers.



Figure:Wax moth (adult**)** **Figure**: Wax moth in bee hive Figure . wax moth eating comb



Figure : pests (organism) Praying Mantises pest attach hive product

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the reason why beeswax should only be stored in its rendered, clean form (5pts)

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

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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Information sheet 5. Moving extracted Wax

Extracted bees wax is moved into and out of storage according to Occupational Health and Safety (OHS) requirements. The extracted wax smell is one of the most important things that can attract the worker bees. It can be considered as the material used in baiting of bees hive to trap the swarm. If the time of moving the extracted wax is when the bees are active, the person moving the wax can be crushed with bees and receive several sting that can cause allergic reaction. So the person moving should consider:

- When honey bees are less active.
- Avoid moving in rainy, windy time
- Use Smoke repel the bees care is important not to contaminate bees wax
- While moving move slowly and quietly to avoid crashing
- Wash your protecting materials (glove, overall etc) that aggravate bees sting

The bees wax is sorted according its appearance, color (dark and light wax separately), purity and placed in plastic materials and etc (moisture and dust proof) moved in and out of storage. Reduce wax contaminating materials by moving an aerated weather condition and finally dispatch it out of store.

Some of the materials used for moving of wax

Fig 16.Nylon container

Figure : wax strips

Figure : Green land wax packaging cartons

Figure : cartons

local materials (false banana leaf)

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the Occupational Health and Safety (OHS) requirements when moving extracted bees wax in and out of storage (4pts)

2. What is sorting? Give an example. (4pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

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Information Sheet 6- Checking extracted beeswax

Introduction

The remove any debris by straining of beeswax using hot water bath and solar wax melter method after melting. The process by which wax from honey combs is converted in to blocks of clean beeswax by melting is commonly called rendering

Checking extracted bees wax on different parameters

Besides physical and chemical specifications there are judging points/ checking points for beeswax. These are:

- Color: - should be light and bright
- Cleanses: - Beeswax should be free from dirty debris bad odors, propolis and honey. The impurities can be removed by heating and allowing standing for several times without disturbances.
- Uniformity of appearance: should be free of bubbles and layers
- Cracking and shrinkage: - should be free of cracking

Figure : extracted bees wax

A. Detection of Adulterated Beeswax

The following methods may help to detect adulterated beeswax these are: **-**

- **Specific gravity**

The suspect wax will probably sink rapidly to the bottom of the test liquid.

- **Melting point**

Pure beeswax has an extended MP b/n 143 F-147 F (62 0c -64 0c) which may readily checked

- **Other tests: -**

  Drop a little wax on an iron shovel or a tin lid heated an a stove or fire to just below red hot;-

  - Any adulterated fat will have acrid smell of burning fat, and greasy black smoke
  - Pure beeswax will have clean, fragrant smell
  - Pure bees wax gives glossy surface when cut by knife
  - If pure bees wax is warmed in 10% H2 SO_4 resin it gives red color
  - Pure beeswax dissolves completely in carbon tetrachloride and impurities drop out.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the judging points/ checking points for beeswax besides physical and chemical specifications (5pts)
2. Mention the methods which may help to detect adulterated beeswax (5pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

1

- _____
- _____
- _____
- _____

Information Sheet 7- Cleaning of storage and handling equipment

7.1. Specific Requirements in Rooms where wax are prepared, treated or Handled

Design and layout to permit good hygiene practices, including protection against contamination between and during operations

Floor

- Are the surfaces maintained in a sound condition and easy to clean and, where necessary, to disinfect?
- Is it impervious, non-absorbent, washable and non-toxic materials or appropriate to prevent contamination?
- Do they allow adequate surface drainage?

Walls

- Are the surfaces maintained in a sound condition and are easy to clean and, where necessary, to disinfect?
- Is it impervious, non-absorbent, washable and non-toxic materials or appropriate to prevent contamination and does have a smooth surface up to a height appropriate for the operations?

Ceiling:

Are the ceilings (or, where there are no ceilings, the interior surface of the roof) and overhead fixtures constructed and finished so as to prevent the accumulation of dirt and to reduce condensation, the growth of undesirable mould and the shedding of particles?

Windows and other opening

1. Are they constructed to prevent the accumulation of dirt?
2. Are those, which can be opened to the outside environment, where necessary, fitted with insect-proof screens, which can be easily removed for cleaning?
3. Are, where open windows would result in contamination, kept closed and fixed when needed?
4. Are the **doors** easy to clean and, where necessary, to disinfect and have smooth and non-absorbent surfaces or appropriate to prevent contamination?

5. Are, in areas where wax is handled in a sound condition and are easy to clean and, where necessary, to disinfect?
6. Are these smooth, washable corrosion-resistant and non-toxic materials or appropriate to prevent contamination

Cleaning facilities

- Are adequate facilities provided, where necessary, for the cleaning, disinfecting and storage of working utensils and equipment?
- Are these facilities constructed of corrosion-resistant materials, easy to clean and do they have an adequate supply of hot and cold water?
- Does the every sink or other such facility provided for the washing of wax have an adequate supply of hot and/or cold potable water and kept clean and, where necessary, disinfected?
- Are the cleaning agents and disinfectants are stored separately under lock and key?

7.2. Preparing your Cleaning Schedule

Begin at the back of your premises and write down every piece of equipment that needs to be cleaned as you walk towards the front. Complete the following table.

Examples of when areas/equipment should be cleaned:

- Daily – food contact surfaces, utensils, equipment, floors, counters, benches, etc.
- Weekly – refrigerators, cold rooms/freezers, cupboards, ovens, etc.
- Monthly – walls, light fittings, windows, etc.
- Annually – exhaust canopy ducting, etc.
-

List areas/equipment that need cleaning (eg floors, bains-marie, utensils, etc.)	Provide details of how often each area/ equipment should be cleaned (daily, weekly, monthly, yearly)	Person responsible for each cleaning task (eg Kitchen Hand, Supervisor, etc.)

Make copies of this page and use this information to complete Record 8 – Cleaning and Sanitizing.

Program 2 **Cleaning and Sanitising**

Preparing your cleaning procedure

Using the following tables, please write down how you will clean your premises and equipment and what materials and chemicals will be used (one table per area/piece of equipment).

Area/equipment to clean:	
Cleaning steps:	**Notes/Comments:**
How often:	**Who will clean:**
Products used:	

Self-Check -7	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the important points considered in cleaning of storage and handling equipment (10pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

1

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Information Sheet 8- Minimizing the effect of dusts

Dusts are one of the most series problems in handling, transporting and storing of bee products that can reduce the value of products by contamination. So the following measures has to be use to minimize the effect of dust during the movement of extracted wax in-to and out of storage. These are:

- Clean and sanitize the equipments used regularly
- Moving wax into and out of storage at less windy time.
- Adjusting the movement against the prevailing wind direction
- the constructed material should prevent the accumulation of dirt (window, other openings)
- every sink or other such facility provided for the washing of wax have an adequate supply of hot and/or cold potable water and kept clean
- covering the wax with appropraite materials that protect the wind effect
- planting wind break around the product storage

Self-Check -8	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the ways in which one can minimize the effect of dust (4pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date _____

1

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Operation sheet -1	**Cleaning of storage and handling equipment**

Operation title: **Procedures of cleaning and handling equipments**

Purpose	To acquire skill on the Procedures of cleaning and handling equipments.
Equipment ,tools and materials	• Detergents, brushes, buckets, PPE, water, materials and equipments planned /unplanned to be cleaned ,and all necessary equipments and tools needed for the specified work accordingly
Conditions or situations for the operations	• All tools, equipment's and materials used in bee product processing should be available on time when required. • Store for storage of product, workshop to prepare/ process bee products damaged or maintained equipment and machines.
Procedures/ steps	1. list areas of equipment that need cleaning 2. provide details of how each areas should be cleaned 3. person responsible for each cleaning task 4. use your PPE 5. prepare appropriate cleaning materials 6. Clean the area/ equipment properly 7. Fill table given as formt for the report
Precautions	• Care for equipments that do not cleaned by water • Care should be taken while one part before another (walls cleaned before floor) • Care for drainage from the processing area not to contaminate the area.
Quality criteria	• Appropriate superviser to evaluate them • Follow cleaning schedule • Following the format quality report

LAP Test	Practical demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 3 hour.

Task 2 conduct cleaning of storage and handling equipment

References

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Food Safety And Standards Authority Of India Ministry Of Health And Family Welfare Government Of India New Delhi ,2016

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