Bee Product Processing -Level-II

Based on October 2019, Version 2 Occupational standards

Module Title: - Preparing Must Process

LG Code: IND BPP2 M11 LO (1-4) LG (33-36)

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United Nations
Educational, Scientific and
Cultural Organization

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LG #33	LO #1- Prepare the honey dissolving process for operation

Instruction sheet

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

- Confirming product and materials availability
- Selecting quality honey and water with desired flavor
- Preparing product and materials
- Confirming services availability
- Checking and confirming equipment readiness
- Setting the process

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:

- Confirm product and materials availability
- Select quality honey and water with desired flavor
- Prepare product and materials
- Confirm services availability
- Check and confirming equipment readiness
- Set the process

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- Confirming products and materials availability

Introduction

Must (unfermented honey solution) preparation is the most important input for mead production. As an input, there are different ingredients and tools and equipment required for successful must operation. Thus, before starting the operation, confirming the availability of required amount of products, desired equipment and materials is essential to undertake the task easily.

Definition of terminologies

Must: is the unfermented honey solution or mixture of extracted honey with water and additives desired for mead production

Honey: is the natural sweet substance, produced by *Apis mellifera* bees from the nectar of plants or from secretions of living parts of plants, or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature.

Extracted Honey: is the purified honey or honey that separated from wax by using extracting equipments

Additives: Additives are substance added to something in small quantities to improve or preserve the product.

1.1. Confirm products and materials availability

Identifying the availability of product, materials and equipments is the key for must preparation. The required amount of product (honey), reagents and functional equipments availability must be confirmed before starting must preparation. Accordingly, in order to prepare the *Must*, the following products, reagents or additions and equipments are required.

Required products, materials and equipments for must preparation

Products

- **Honey:** a range of honey varieties: (Honey with different flavor and colour depending on its availability).

Figure 1: extracted honey

Figure 1: extracted honey

Solvents

- **Water:** any clean, good-tasting and chlorine free water

Additives may include: the common additives required for must preparation area listed below.

- Enzymes
- Sulphate
- yeast
- Citric acid
- Diammonium monohydrate phosphate
- Potassium bitartrate and
- Magnesium chloride

Important equipments for 'must' preparation

The common equipments required for 'must' preparation are listed and discussed as below.

Honey boiler: is used for heating honey and water for dissolving honey and water

Figure 2: Honey boiler

Pasteurizer: used to eliminating of bacteria and yeast, which cause spoilage of hone and melt crystalized honey

Figure 3: Pasteurizer

Sanitizer: is used for cleaning materials and equipments before and after working activity

Figure 4: Sanitizer

Large Stainless Steel Pot: used for heating or boiling honey for must preparation process

Figure 5: Large Stainless Steel Pot

Large Stainless Steel Spoon: is used for swearing or mixing of the honey solution during heating and adding additives

Figure 6: Stainless Steel Spoon

Large Funnel: is used for filtering and minimizing wastage of honey solution during preparation of honey process

Figure 7: Funnel

- **Kitchen Thermometer:** is used for reading the temperature of honey during heating and pasteurization

Figure 8: Kitchen thermometer

- **Carboy/ Bucket:** is used to hold the diluted honey solution

Figure 9: Diluted honey container

Self-check 1	Written test

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 required products, materials and equipments for must preparation (6 point)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____

_____

_____

Information Sheet 2: Selecting quality honey and water for must preparation

Quality honey and water is very important for 'must' preparation. In must preparation selecting of quality honey and water is essential to produce good flavored mead.

2.1. Honey selection

The type of honey selected is as important to the flavor of mead as grape varieties are to the flavor of wine. The floral source used by bees determines the flavor characteristics of their honey, which translates directly into the flavor of the mead. Strong flavored honeys make strong flavored meads, and lighter flavored honeys yield lighter flavored meads. One of the more interesting and creative aspects of mead production is the selection and blending of different honeys to achieve a desired flavor profile.

In addition to flavor, color must be considered when selecting honey, as this obviously impacts the appearance of the finished product. Standardized color indexes are used to categorize honey under one of the following: water white, extra white, white, extra light amber, light amber, amber and dark amber. Honey color is not indicative of quality, and it is not necessarily proportionate to the flavor intensity.

Honey that has undergone minimal processing is the most desirable. Many commercial honeys receive detrimental heat treatments to retard crystallization. Depending on the extent of the treatment, many of the more interesting nuances of a honey's flavor can be lost. In addition, most supermarket honey has been blended to the extent that no distinctive varietal characteristics remain, even though they often state "clover honey" on the label.

2.2. Selection of desired flavor of water

Added water is a major ingredient in mead, generally making up more than 65% of the final volume. For must preparation, any clean, good-tasting water will work. If there is

chlorine in the water, you will need to remove it before mixing with honey. Activated carbon filters work well for this.

Self-check 2	Written test

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 importance of honey selection for must preparation? (6 point)
2. What type of water is important for must preparation? (4pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____
2. _____
   _____
   _____

Information Sheet 3: Preparing of product and materials

Preparation of required product and materials

Preparation is a process of preparing and getting ready materials and equipment before undertaking the operation.

Must preparation needs a pre-preparation of products (different ranges of honey with good flavor and color), and clean water free from chlorine. Preparing of the required equipments for this activity is essential. Beside to this the important additions or reagents should be prepared with the required amount. Every ingredients or addition for this Must preparation should be made ready before starting the operation. Accordingly, for this activity the common ingredients and equipments might be used are listed as below.

The amount of honey you will require depends upon your target finished alcohol, desired residual sugar and whether or not you are going to “stretch” the honey with less costly sugar. The proportion to which honey is diluted determines the type of mead obtained: the finest at 1:2 (honey: water). The amount of additions or reagents to be added to unfermented honey solution (must) should be based on the enterprise guidelines. The equipments used for this operation must be sanitized before and after using.

Range of honey varieties

Honey is the major input in ‘must’ preparation. The color and flavor honey of honey may differ depending on floral source. Even though there might be a variation of honey composition. However, the flavor of the honey will determine the final honey-wine flavor.

Depending on its availability, the type of honey selected is as important to the flavor of mead as grape varieties are to the flavor of wine. The floral source used by bees determines the flavor characteristics of their honey, which translates directly into the flavor of the mead. Strong flavored honeys make strong flavored meads, and lighter flavored honeys yield lighter flavored meads. One of the more interesting and creative aspects of mead production is the selection and blending of different honeys to achieve

a desired flavor profile. The honey used in must preparation must be extracted, since 'must' is prepared from extracted honey.

Additives: Additives are very crucial in must preparation for preserving and flavoring activities. Among the most common additives are: ammonium Sulphate, potassium phosphate, magnesium chloride, citric acid, sodium citrate, biotin, pyridoxine, myo-inositol, calcium panthotenate, thiamine and peptone are used in 'must' preparation across the different countries.

Ingredients for one liter of must are specified as below

Table 1: Recommended amount of ingredients for must preparation

Amount	**Nutrients**
5.000 g/lit	Citric acid (or 2.528 g citric acid and 2.468 g of sodium citrate, which require less pH adjustment)
1.229 g/lit	Ammonium Sulphate
0.502 g/lit	Potassium phosphate (K2PO4)
0.185 g/lit	Magnesium chloride
26.42 mg/lit	Peptone
52.80 mg/lit	Sodium hydrogen Sulphate
5.28 mg/lit	Thiamine (vitamin B_1)
2.64 mg/lit	Calcium pantothenate
1.98 mg/lit	Meso-inositol
0.26 mg/lit	Pyridoxine (vitamin B_6)
0.013 mg/lit	Biotin (vitamin H)

Water: is one the most important nutrient which used for dilution of honey and different cleaning purpose before, during and after 'must' preparation. Water is a major ingredient in mead, generally making up more than 65% of the final volume. The water

used for must preparation, must be clean, good-tasting. In ‘must’ preparation 10 liter of clean water should be diluted with 1.5kg kg of extracted honey.

Yeast: an adequate quantity (3-5%) of selected, active, acid resistant champagne yeasts or brewers yeasts, but not bread yeasts, are added. The choice of yeast influences the final flavor, but selection is more important in order to have complete and uninterrupted fermentation. An actively growing yeast solution should be prepared for larger batches. For small batches, the yeasts can be added directly to the must.

Self-check 3	Written test

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 importance of pre-preparation products and materials? (6 point)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____

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Information Sheet 4: Confirming services availability

Services availability

In order to operate Must preparation, there must be an accessibility of infrastructures to undertake the operation process successfully. Before conducting the task confirming the availability and functionality of different services is very important. Since operating the must preparation process without service is difficult. Among different services, the most frequently required services are electrical service (power), water accessibility, compressed air and inert gas. These services are very critical for the operation of must and to be confirmed before conducting the operation.

Electrical accessibility (Power)

Electrical accessibility is very critical in must operation for heating or boiling water, honey and, pasteurizes the honey**.**

Accessibility of water

Accessibility of water is also very important and critical for dissolving honey (making honey solution) and for different cleaning activity in must preparation process. Thus, water must be freely accessible in the workplace area.

Compressed air

Air compressor is also the most important equipment in must preparation. At the start of each process, air compressors pull air in from the surrounding atmosphere, creating the pressure that is the key in nearly every process moving forward. The next part of the process involves pushing liquid from one tank through piping while maintaining ideal conditions along the way.

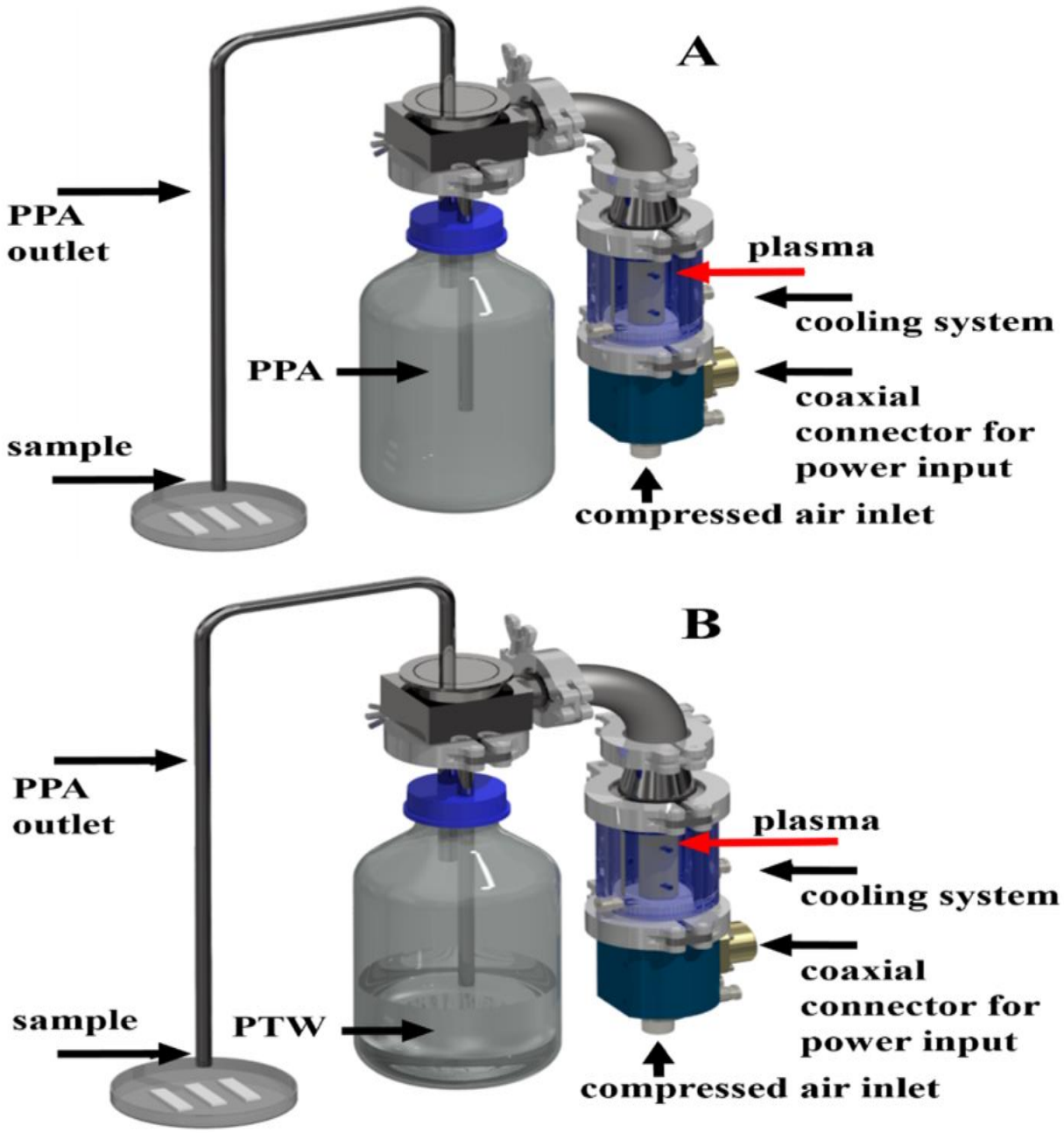


Figure 11: Air Compressor

- **Inert gas:** is one of the best solutions for controlling oxygen exposure to aging wine. It protects the wine from oxygen and keeps the wine freshness, sherry-like aromas and flavors, and volatile acidity production.

Figure 12: Inert gas system

Self-check 4	Written test

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 importance of using air compressor in must preparation? (6 point)
2. What is the importance of inert gas in must preparation? (6pts)

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

Note: **Satisfactory rating –7 points** **Unsatisfactory – below 7 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____
2. _____
   _____
   _____

Information Sheet 5: Checking and confirming equipment

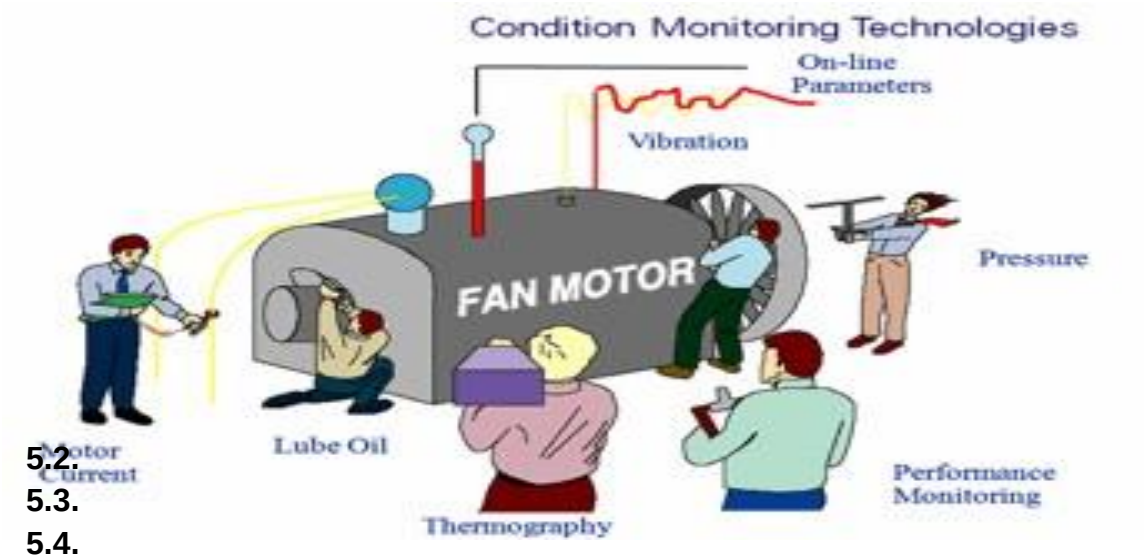
5.1. Importance of checking equipment

The purpose of an inspection is to identify whether work equipment can be operated, adjusted and maintained safely with any deterioration detected and remedied before it results in a health and safety risk. The need for inspection and inspection frequencies should be determined through risk assessment

This checking and equipments is very important as to identify and confirm that hygiene and sanitation standards, safety standards and pre-start requirements are met and that equipment is operational. Similarly, it enables us to check the operation and calibration status of measuring instrumentation.

Check each component of the equipments properly to confirm:

- The used equipment are mending to the specification
- The used equipment are installed according to manufacturer's specification
- The input and the outputs are connected according to manufacturer's specification
- The calibration of the equipment are correct
- The sanitation standard of the equipment according to workplace procedures
- The overall functionality of the equipment



5.2.

5.3.

5.4.

Figure 12: checking of equipment

Self-check 5	Written test

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 importance of checking equipment? (6 point)
2. During checking what are points should be confirmed? (6pts)

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

Note: **Satisfactory rating –7 points** **Unsatisfactory – below 7 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____
2. _____
   _____
   _____

Information Sheet 6: Setting the process

Setting the must process

Since must is said to be the diluted honey mixture (mixture of honey, water and additives). In order to prepare the must all the pre-required products, materials, equipment, tools and additives are must be identified and become ready based on the quality and quantity required to be added. After confirming all the necessary materials, start mixing of all the required amount of ingredients with respect to its procedures or workplace procedures and guidelines.

Figure 13: setting of tools and equipments for must process

Self-check 6	Written test

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 does the term setting must process mean? (12 point)

Note: **Satisfactory rating –7 points** **Unsatisfactory – below 7 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____

LG #34	LO #2- Operate and monitor the dissolving process

Instruction sheet

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

- Starting the dissolving process as workplace procedures
- Monitoring control points
- Monitoring equipment
- Identifying, rectifying and reporting defected products and equipment

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**:

- Dissolve process as workplace procedures
- Monitor control points
- Monitor equipment
- Identify, rectify and report defected products and equipment

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.
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7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
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9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Starting the dissolving process as workplace procedures

Dissolving of honey, water and different additives should implemented using the recommended levels of ingredients in respecting to workplace procedures. See learning guide 33 (LG-33) table 1 for recommended amount of ingredients to be used in for must preparation.

1.1. Honey, Water and Additives mixing

The must preparation consists basically in the mixture of water and honey. The required amount of must ingredients including honey, chlorine free water and other additives such as Sulphates, citric acid, diammonium monohydrate phosphate, potassium bitartrate, magnesium chloride and starter yeast should be added into the fermenting bucket (see LG 33, table 1) and mixed thoroughly based on the recommended work place procedure.

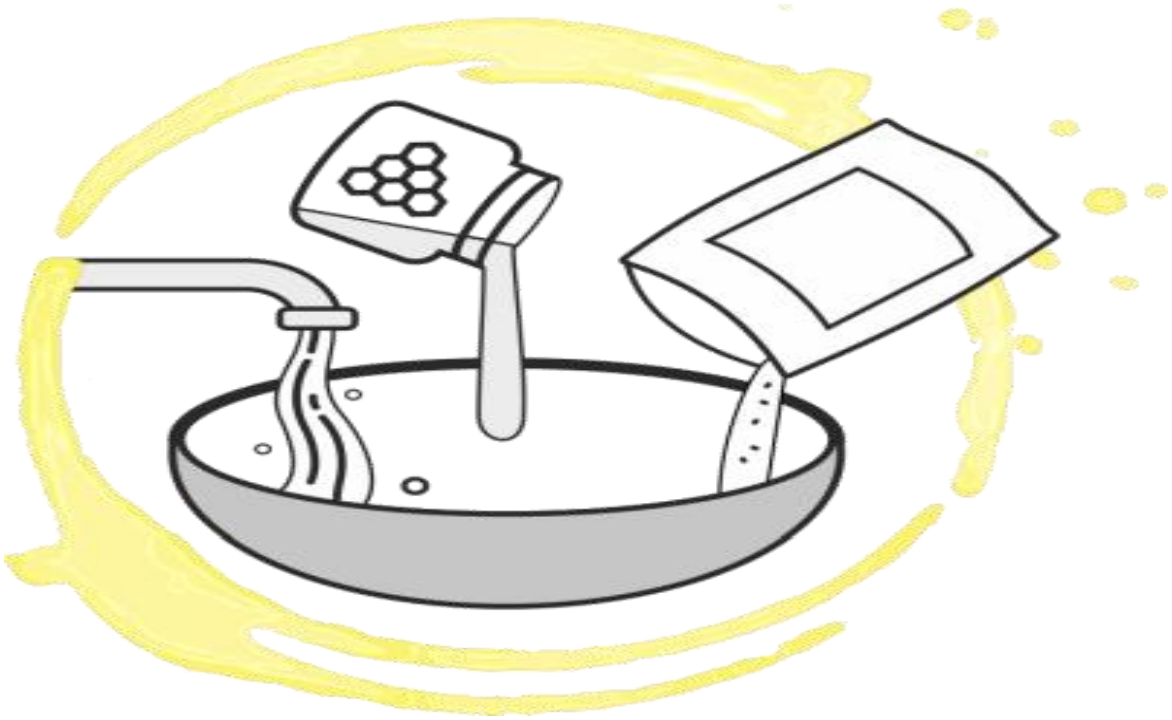

Figure 1: Mixing of honey, water and additions

Boiling or heating

In preparation of must, boiling or heating of the diluted honey is very essential. The honey should be heated or boiled at 190 ^{o}F ranges for 10 to 20 minutes. This practice used to eliminating risk of infection by a full boil or by heating to a lower temperature for a prolonged period. Boiling sterilizes the mixture while denaturing and eliminating most of the haze-forming proteins. Also it used for elimination of biological contaminants and the proverbial "hot break" which will remove protein and other colloidal materials in the honey, and the potential for using your heat to sanitize fruit or other potentially infecting ingredients. The negatives include the driving off of all volatile aroma compounds, which give fresh honey its distinctive aroma. When the mead starts to heat up, you will notice a white layer of foam or scum that rises to the surface.

Figure 2: Honey heating

Pasteurization

Pasteurization has been used as a compromise. Heating the honey-water mixture at a temperature of 150 °F for 20 minutes has been reported to work well for eliminating biological load while not inflicting as severe a blow to the aromatic integrity of the honey. Unfortunately, this process still requires special equipment and does not eliminate the potential for haze formation. It is most likely that fining will be required to eliminate unstable proteins. However, it will destroy any wild yeast in the honey but will preserve more of the volatile flavor components

SULFITING

An alternative method of sanitizing the must is "sulfating." The advantage of this method is that there is no heating. Simply dissolve the honey in water along with the acid blend and yeast nutrients and add the sulfites. The major disadvantage is that some individuals are allergic to sulfites and would not be able to consume mead that is made with sulfating agents. Also care must be taken not add too much sulfite as levels in the 60-70 ppm range can inhibit yeast growth. Since proper adjustment of levels requires an accurate scale and pH meter, sulfiting is not recommended for the mature mead maker.

The use of Sulfites to produce quality meads has the advantage of ease and lack of heating (avoidance of driving off desirable aroma compounds, no color change). The minimum threshold for adequate sanitation is 70 ppm, which equates to 0.4 grams per gallon at pH 3.5 and the maximum thresh hold is 100 ppm,

ADDING THE YEAST

If the ‘must’ has been sanitized by heating, the yeast cannot be added or "pitched" until the must is at room temperature (approximately 70-75°F). When using sulfites to sanitize, let the must stand for 24 hours before adding the yeast. If using dry yeast, activate it by stirring the packet of yeast into 4 ounces of warm water (80 °F). Allow the yeast to hydrate for 10 minutes before stirring into the must. Yeasts used in mead production are 3-5% active yeast culture or starter yeast, which is used to initiate the metabolize sugars, such as glucose and fructose, resulting in the formation of ethanol and carbon dioxide.

In short must preparation process is presented as diagram below

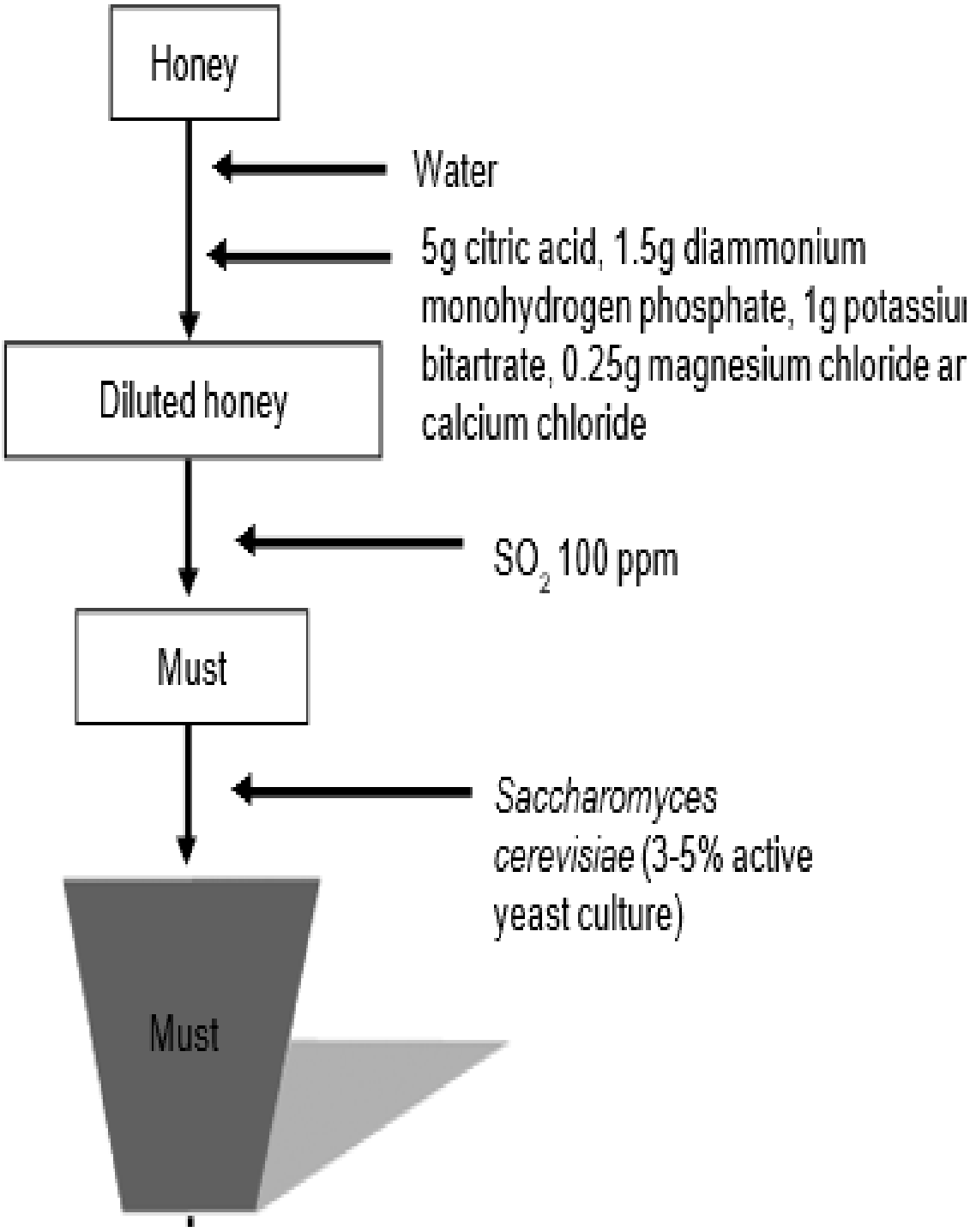

Figure 3: Must preparation process

Self-Check – 1	Written test

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. List the required products and materials for must preparation(3pts)
2. What is the importance of heating and pasteurizing honey for must preparation?(4pts)
3. Describe the basic method of must preparation (3points)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____
2. _____
   _____
   _____
3. _____
   _____
   _____

Information Sheet 2- Monitoring control points

Monitoring is a plan which includes observations or measurements to assess whether the CCP is being met. It provides a record of the “flow of food” through the establishment. If monitoring indicates that the critical limits are not being met, then an action must be taken to bring the process back into control.

2.1. Critical Control Points

Critical control points (CCPs) are steps at which essential control measures designed to prevent or eliminate a food safety hazard or to reduce it to an acceptable level are applied. In other words, they are specific production stages where the implementation of appropriate control measures will ensure the elimination or minimization and avoiding of a specific hazard. Accordingly, in order to maintain the quality of must for final good mead production, identifying the Critical control points (CCPs) with their critical limits for each control measures is mandatory. Thus, must preparation, the critical control points and critical limits for each control measures that must be followed are identified and described as table below.

Table 2: Critical Control Points of *must*

Critical control points (CCPs)	**Critical limits for each control measures**
Heating temperature	at 190 ^{o}F ranges for 10 to 20 minutes
Pasteurization	Pasteurizing temperature at 190 °F for 10 to 20 minutes
Addition of yeast	Do not add until the must is at room temperature 70-75°F 3-5% active yeast culture
Ingredients	
Sulfites	The minimum threshold 70 ppm, which equates to 0.4 grams per gallon at pH 3.5. The maximum threshold is 100ppm
Water	Clean and chlorine free
Citric acid	5g / litre of diluted honey solutions
Ammonium monohydrate	1.5g / litre of diluted honey solutions
potassium bitartarate	1g / litre of diluted honey solutions
magnesium chloride	0.25g / litre of diluted honey solutions
calcium chloride	0.25 / litre of diluted honey solutions

Self-Check – 2	Written test

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 importance of monitoring control points in must preparation?(10pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____

Information Sheet 3- Monitoring Equipments

Monitoring of equipments is very important to maintain the quality of must as to achieve the desired production of mead with good flavor. Similarly monitoring of equipment is used to identify the defected equipments which have a negative impact on must operation and suggest for maintenance. Monitoring involves the regular measurement of parameters such as functionality, vibration, temperature and sound in and around machines and equipment. The equipment component defects are recognized at an early stage for maintenance or purchasing new and the remaining runtimes of bearings, shafts, etc.

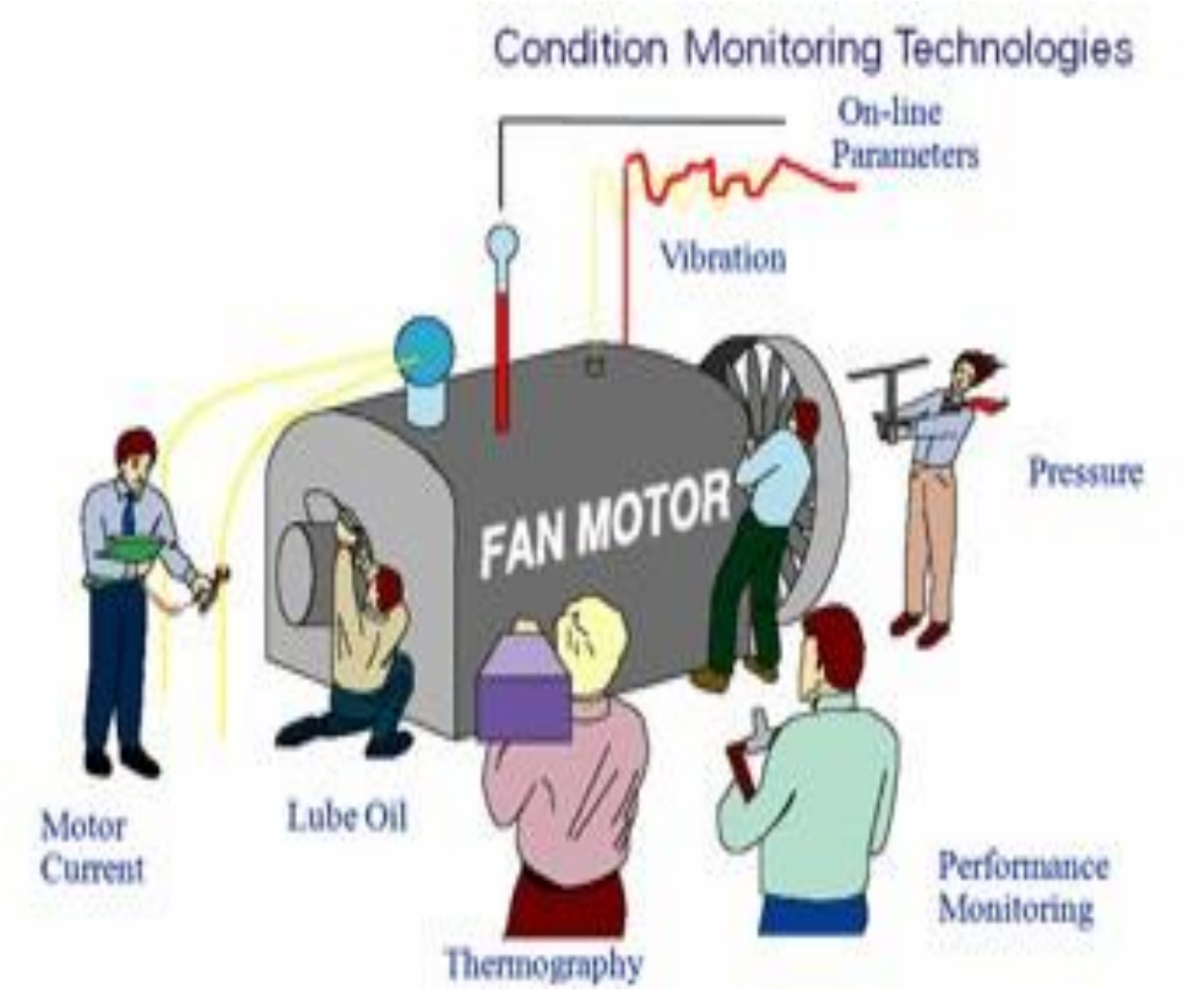

Figure 4: Monitoring equipment

Self-Check – 3	Written test

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 importance of monitoring equipments ?(10pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short answer questions

1. _____
   _____
   _____

Information Sheet 4- Identifying rectifying and reporting defected products and equipment

4.1. Identifying defected products and equipment

Equipment procedures and maintenance guidelines should be kept in a central location for quick reference when needed. If missing, request complimentary copies from manufacturer or maintenance contractor. Malfunctions, faults, wear or damage to equipment are identified and reported in line with enterprise requirements. Since factors vary among installation sites, equipment users must work closely with each of their suppliers to ensure that proper data is being collected, that the data is being provided to the correct supplier, and that the resulting solutions are feasible.

All events (failures) that occur during inspections and tests should be reported through an established procedure that includes collecting and recording corrective maintenance information. The data included in these reports should be verified and then the data should be submitted on simple, easy-to-use forms that failures are tailored to the respective equipment or software.

Then check and report to your supervisor how much of the materials he/she provided in the list are functional and how much of them are faulty. Then are the functional tools and equipment's sufficient enough to the poultry raising activity with the available labour power. Then after reporting the faulty and functional materials your supervisor will guide you what to do if there is insufficiency of material for that particular poultry production activity.

4.2. Reporting defected products and equipment

A damage defect report is a report that summarizes the overall findings of damage that has occurred to a property, vehicle or equipment. It helps understand the background to a claim and also documents information regarding details of the accident and the extent of the damage.

This is essential as to identify defected equipments that need routine maintenance and complex maintenance. Those materials that need simple maintenance should be rectified without any delay with technician or instructor having knowhow about

maintenance if not report. Accordingly, the equipments needs complex maintenance should be reported to the supervisors with reporting format.

Why Reporting?

- Accountability
- Program monitoring
- Program evaluation
- Program improvement
- Sharing the lessons learned with other

Figure 5: Reporting

Self-Check -4	Written Test

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

1. Why reporting of fault equipment required to supervisor? (2pts)
2. What will be done after reporting to supervisor? (3pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

_____

_____

_____

2. _____

_____

_____

_____

Operation Sheet 1- Operate and monitor the dissolving process

Operational title:	**Preparing must for mead production**
Purpose	To acquire and develop the knowledge, ability and right attitude to perform preparation of 'must for mead production in accordance with operational standards
Equipment, tools, products and materials	Honey, water, additives, yeast, bucket, heater, pasteurizer. Stainless steel pan and spoon, funnel, sanitizing and cleaning agents
Conditions or situations for the operation:	The must preparation process should be conducted at appropriate room with electrical power, water, compressed air and inert gas were easily accessibility
Procedures	1. wear appropriate PPE 2. Prepare necessary product, materials and equipments 3. Clean and sanitize your equipment 4. Boil your water in a large pot and once boiling, pull it off the stove 5. Combine Honey and Water 6. Add cool water to your mixture to bring the temperature down to an acceptable climate for the yeast 7. Mix the honey and water 8. Add the required amount all additions 9. Gently stir the must 10. Add yeast 11. Seal must containers top 12. Keep record
Precautions	▪ good sanitation practices are essential ▪ use of recommended amount of ingredients ▪ Heating and pasteurizing of must solution at recommended temperature and minute

Quality criteria:	▪ Removal of microbial contaminants ▪ Having good aroma ▪ Heating and pasteurizing of must solution at recommended temperature and minute ▪ Using of kitchen thermometer

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **2** hour. The project is expected from each student to do it.

Task-1: prepare must

LG #35	LO #3- Shut down the dissolving process

Instruction sheet

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

- Shutting down the process
- Dismantling and preparing equipment for cleaning
- Collecting, treating and disposing wastes
- Conducting work as workplace environmental guidelines

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**:

- Shut down the process
- Dismantle and preparing equipment for cleaning
- Collect, treat and dispose wastes
- Conduct work as workplace environmental guidelines

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- Shutting down the process

The must preparation involves several processes which including confirm products, materials and service or infrastructure availability, operate and monitor the dissolving process that is honey-water mixture and additives, heating or boiling, pasteurization, sulfating, adding yeast and other ingredients as recommended level. In addition, to maintain the quality of the product (must), following established critical control points (CCPs) and critical limits for each control measures is very important. After finalizing the process of Must preparation (honey diluted), the container holding the product (must) would be covered and all equipments used should be dismantled, cleaned and sanitized thoroughly.

Self-Check -1	Written Test

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

1. What is shutting down of the process? (6pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____

Information Sheet 2- Dismantling and preparing equipment for cleaning

2.1. Dismantling equipment

After completion of must preparation process, all equipments used in the operation must be dismantled as to simplify for easily and properly cleaning of each components of the equipment. This activity is used to minimize or avoid contamination and increase the shelf life of the equipment.

Figure 6: Dismantling of refrigerator

2.2. Cleaning of equipment

Cleaning is the removal of dirt and organic substances from surfaces of tools and equipment. Through the cleaning procedures, high numbers of microorganisms (90% and more) present on the mentioned objects will be removed. However, many microorganisms stick very firmly to surfaces, in particular in tiny almost invisible layers of organic materials and will not entirely be removed even by profound cleaning but persist and continue multiplying. Inactivation of those microorganisms requires antimicrobial treatments, carried out through hot water or steam or through the application of disinfectants. Cleaning of equipment can be carried out by two methods. These are wet and dry cleaning which are described as table below.

2.2.1. Wet cleaning

- Wet cleaning (e.g. water and steam) should be contained within the immediate area that is being wet cleaned to prevent wetting dry ingredients, packaging, products and dry product areas.
- If product is not removed from the wet cleaning area, the amount of water used should be limited to that necessary to complete the cleaning procedure and not be a source of contamination.
- All equipment and must container surfaces that are wet cleaned should be free from residues and moisture before processing restarts

Figure 7: wet cleaning

2.2.2. Dry cleaning

- Dry cleaning is recommended for areas where dry materials are handled and stored including:
  - ingredient and packaging stores
  - preparation areas for dry ingredients and
  - Outer packaging areas.
- Dry cleaning methods include brushing, scraping and vacuuming.

- Dry cleaning in areas with exposed ingredients or product is only appropriate where moisture level in products is below levels sufficient to support microbial growth.

Figure 8: Dry cleaning

Self-Check -2	Written Test

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

1. What is the importance dismantling equipment? (6pts)
2. What is the importance of cleaning? (4pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

(1) _____

_____

_____

_____

(2) _____

_____

_____

_____

Information Sheet 3- Collect, treat and dispose wastes

In must preparation process, waste generated by both the process and cleaning procedures is collected, treated and disposed of, or recycled according to workplace procedures. In this process, there might be a production of solid and liquid wastes.

Sanitary liquid wastes/sewage and its disposal

The waste water or sewage that is generated from a must preparation at industry level or home based level. The wastes produced at industry level or home level (small scale) is said to be sanitary sewage (waste from washing of equipment and hands) and industrial sewage (wastes from mead industry)

Waste water is one of the major wastes produced in the process of must preparation. This waste can be produced from cleaning of the equipments. The liquid waste produced in this process should be handled, managed and disposed properly to minimize environmental pollution according to workplace procedures. In turn, drinking water can be contaminated, and aquatic ecosystems can be disrupted. Since, Liquid waste can quickly seep into the earth.

Figure 9: liquid waste trash bin

Solid waste and its disposal

In must preparation process, the solid wastes to be produced might include plastic materials and remaining of floating wax. The plastic waste materials should be handled, managed and disposed properly to minimize its environmental pollution according to workplace procedures. The remaining of floating wax must be filtered and stored in separate container for re-use or for extraction of wax.

Figure 9: Solid waste trash bin

- **Points to be consider before selecting one particular sewage disposal technique**

There is no single individual sewage disposal technique that can be universally applied under all conditions. However, the selection of a particular method will depend upon the following major factors:

- The nature of soil formation and stability of the locality
- The availability of adequate land for sewage disposal
- The quantity of sewage to be disposed
- The degree of sewage treatment to be achieved
- The presence of well water, and whether it is used as the source of the water supply
- The level of the water table of the ground water

- The proximity of the disposal site to surface water sources
- The relative cost of the disposal technology

Self-Check -3	Written Test

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

1. What are the types of wastes produced in must preparation? (6pts)
2. What are the points should be considered in waste disposing or treating? (4pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

2. _____

_____

_____

_____

Information Sheet 4- Conducting work as workplace environmental guidelines

According to workplace environmental guidelines in concerning wastes, in processing bee products prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment, focusing on the prevention of irreversible and / or significant impacts. Favoring strategies that eliminate the cause of the hazard at its source for example, by selecting less hazardous materials or processes that avoid need for Environmental Health and Safety controls. In addition to these, environmental guidelines restricts the leakage of liquid wastes to water sources (river, lake and etc) as to minimize its impact to human health and the environment.

Self-Check- 4	Written test

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. List out the works to be conducted in must preparation? (10pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

_____

_____

_____

Operation Sheet 1- Shut down the dissolving process

Operational title:	Dismantling equipments for cleaning
Purpose	To acquire and develop the knowledge, ability and right attitude to perform dismantling of 'must' equipment in accordance with operational standards
Equipment, tools, products and materials	Equipments to be dismantled, different size dismantling tool, water, sanitizing and cleaning agents
Conditions or situations for the operation:	The dismantling process should be conducted at appropriate or special room with electrical power, water and different dismantling tools accessibility
Procedures	1) wear appropriate PPE 2) Prepare necessary materials and tools 3) Identify equipments to be dismantled 4) Dismantle the equipment 5) clean and sanitize the equipment 6) Assemble the equipment 7) Reuse the equipment 8) Record keeping
Precautions	▪ good sanitation practices are essential ▪ Proper handling of equipments while dismantling and assembling ▪ Using of appropriate dismantling tools
Quality criteria:	▪ Sanitation standard ▪ Proper assembling ▪ Functionality

LAP TEST	Performance Test

Name……. ID……..
Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1 Perform dismantling of equipment

LG #36	LO #3- Recording information

Instruction sheet

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

- Recording workplace information
- Documenting workplace Information

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**:

- Record workplace information
- Document workplace Information

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- Recording workplace information

1.1. Collecting workplace information

Each workplace relies on the exchange of information to carry out its daily business. Information is passed from employee to employee, customer to employee, supervisor to team member, supplier to customer, and so on. Dealing effectively with information and records is necessary and important for all organizations. The quantity and variety of information kept by an organization can be huge. Information needs to be sorted into related groups so that it can be stored easily and found when needed. An organization's success depends largely on how well it manages its information. You need to be familiar with the type of information used in your job and the way records are organized so you can collect, file, store and find information quickly and easily. Finding and using information is a large part of many jobs, so knowing how to deal with it is an important workplace skill. Being confident and efficient in this skill helps you and your organization succeed.

Types of information

The types of records held by an organization vary depending on the business.

Common types of workplace information include:

- Messages such as telephone and email
- Correspondence such as letters, memos, faxes and email
- Computer files such as reports and research
- Sales records such as monthly forecasts, targets achieved and sales reports
- Product information such as price lists, catalogues and brochures of our product
- Forms such as claim forms, membership forms, order forms and leave forms
- Electronic databases such as customer records, financial records and library catalogues
- Accounts records such as invoices, credit notes and statements (from suppliers and to customers)
- Personnel records such as employee details, salary rates and annual leave
- minutes of meetings

- Cash handling such as petty cash receipts, cash takings and register readings

Ways of dealing with information

There are different ways to deal with information. Each business will have a system that suits its needs. For instance, a large company might have a centralized, electronic system that allows its workers to access information from any location throughout the world. A small company may have a specialized system that integrates different types of information into the way staff works (for example, paper-based filing systems and databases). Every organization is different. The most important thing is to know how your workplace operates.

Types of recording or documenting

The following are the most common ways of information recording methods

1) Paper-based records

Examples of paper-based records include:

- Reports
- Magazines, journals and newspapers
- Project files
- Contracts
- Minutes of meetings
- Business letters
- email messages and memos
- Faxes
- Forms
- Production out put

Figure 1: File cabinet system

2. Electronic based records

Many organizations store records and information electronically. Storing information electronically can save space and paper. Examples of electronic records include:

- Computer databases such as library catalogues
- Customer records, sales records and financial records
- Electronic correspondence such as email and faxes computer files of letters, memos and other documents.

Information can be easier to access if it is stored electronically. You can search through records and copy information easily into other documents or files. The information in electronic records can also be updated, deleted or changed more easily than hard copy records.

Figure 2: Electronic records

What will be the frequency of information or data collection and what will be the number of data?

- Daily
- Weekly
- Periodically, etc.

Where should the recording instrument be located?

- At the workplace
- At the office
- At home

Who is incharge of the recording (responsibility)?

- The processor
- The production supervisor or the manager

Self-Check- 1	Written test

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. Lit and discuss the types of information recording? (10pts)

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

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

2. _____

_____

_____

_____

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This TTLM was developed on September, 2020 at Bishoftu Management Institute

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