Alcoholic &Non Alcoholic Beverage Processing

Level-II

Based on October 2019, Version 2 Occupational standards (OS)

Module Title: - Operating Clarification by Separation

LG Code: IND ANP2 M07 LO (1-4) LG (31-34)

TTLM Code: IND ANP2 TTLM 0920v1

September, 2020

Addis Ababa, Ethiopia

Table of Contents

LG #31	LO #1- Prepare the clarification by separation (centrifugation) process

Instruction sheet

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

- Confirming available product and raw material
- Applying environmental guide lines
  - ✓ Identifying and Controlling potential health and safety hazards
- Selecting, fitting and using personal protective equipment
- Preparing product to meet clarification process
- Confirming services for operation
- Checking equipment readiness for use
- Setting process parameter to meet clarification 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:

- Confirming available product and raw material
- Applying environmental guide lines
- Identifying and Controlling potential health and safety hazards
- Selecting, fitting and using personal protective equipment
- Preparing product to meet clarification process
- Confirming services for operation
- Checking equipment readiness for use
- Setting process parameter to meet clarification 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 available product and raw material

1. Confirming available product and raw material

1.1. Products directly related with grape includes

Juice: juice collected during crushing and pressing (free run juice).

Fortified product:

Red wine post-fermentation: a wine we get after fermentation and we call it still**.**

Ferments post settling: fermented wine after waiting for certain period of time to settle out lees to the bottom of fermentation vessels.

Decanted wine (for liquor production): a wine which is fermented and then clarified by repeated racking after proper settling of

Sparkling product: An effervescent wine containing more than 0.392 grams of carbon dioxide per 100 milliliters of wine resulting solely from the secondary fermentation of the wine within a closed container.

1.2. Raw materials that are used for wine clarifications, finning products.

Some common fining materials

Egg White - to remove astringency from red wine, a typical dose is 2 or 3 egg whites for 60 gallons of wine.

Bentonite - to remove protein from white wine, a typical dose is 1 to 2 g/gal. For general clarification, a typical dose is 1 g/gal.

Casein - to remove browning in white wines, a typical dose is 0.25 g/gal. To remove bitter taste in white wine, a typical dose is 2g/gal. To remove excess oak flavor, a typical dose is 2 g/gal.

Gelatin - for white wine clarification, a typical dose is 0.125 g/gal. To remove bitter tastes from white wine, a typical dose is 0.25 g/gal. - For tannin reduction in red wine, a typical dose is 1 g/gal.

Sparkolloid - for general white wine clarification, the typical dose is 2 g/gal. - used as a topping over bentonite, a typical dose is 0.5 g/gal.

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: Choose the best answer (4 point)

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

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

Information Sheet 2- Preparing product to meet clarification

2. Preparing product to meet clarification

A large amount of sediment will settle out of the wine in the first day or so after pressing. This layer is referred to as the lees. What drops out in the first 24 hours is called gross lees, there is nothing beneficial or helpful about them. In fact, the gross lees are often a source of harsh and bitter compounds that, if left in contact with the wine for an extended period of time, can develop negative sulfur flavors and aromas. In order to avoid potential problems, we suggest that you transfer the wine off of the gross lees between 1 to 2 days after pressing. After this transfer, the resulting wine is often quite clean and will have only a small quantity of light or ine lees (clean yeast, free of solids) that settle out to form a thin layer on the bottom of the vessel. Unlike the gross lees, the light lees are very beneficial to red wine at this stage and will serve as a nutrient source for the Malolactic Fermentation(MLF). Once off of the gross lees, the wine can safely work in a carboy, tank or barrels for the several weeks needed to complete the MLF.

Note: It is desirable for red wine to get exposure to oxygen during the first transfer, but only at the first racking. This serves to start rounding the flavors a little sooner. You can do this by simply lifting the transfer tubing up during the racking so that the wine runs down the side of the carboy or tank that you are transferring into. For all other subsequent transfers you will want to avoid the wine's contact with air, and to leave the transfer tubing at the bottom of the vessel so it doesn't splash while you are transferring.

Consider the following activities just before applying centrifugation process

- Chill the wine to less than 45 degrees to stop fermentation and leave residual sugar in the wine
- Keep the wine cold and allow the yeast to settle.
- Remove most of the yeast by racking or filtration.
- Warm the wine to room temperature, and restart fermentation.
- Repeat this process several times untilfermentation cannot be restarted.
- Each new generation of yeast consumes nutrients from the wine, and after several generations of new yeast cells, the nutrients are so depleted the yeast can no longer reproduce.

This method effectively stabilizes sweet wines and with careful handling, it maintains wine quality. But, this method requires lots of time, effort and skill.

2.1. Combined Hot & Cold Stabilization

Since white and blush wines need to be made both hot and cold stabile, some winemakers prefer to

combine both stabilization procedures into a single operation.

- The wine is first fined with bentonite and then chilled to about 28 degrees.
- The wine is held at the cold temperature while the tartrate precipitate.
- After a week or so, the cold wine is racked or filtered off the bentonite and tartrate lees.

This combined procedure has several advantages.

- Tartrate crystals settle on top of the fluffy bentonite lees and the Bentonite lees are compacted.
- The wine is easier to rack and less wine is lost. In addition, both procedures are accomplished in a single operation, so the wine is handled fewer times and the risk of oxidation is reduced.

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

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

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

3. Confirming availability and readiness of services

Any Chemical Plant requires raw materials in order to produce final products. It also requires various other services called Utilities for smoothly carrying out the processes. Utility is neither a reactant nor a product, but utilities are required for maintaining adequate conditions of a manufacturing unit. Common utilities are air, inert gases, water, steam, fuel, refrigerants (or, coolants) etc. Utilities also include electric power, so power plants are also considered as a part of services. Services that May include but not limited to: Power, water, compressed air and inert gas should be available and meet to the standard.

3.1. Power source (Fuel and electricity):

This is essential utility required for heating, steam generation, burning purpose, etc. It can be solid (coals, etc.), liquid (fuel oils, etc.), and gaseous fuels (natural gas, etc.).

Electricity: It may be purchased or self-generated. Which is a main power source to drive machineries accordingly.

3.2. ***Water****:* It is most widely used process utilities. Water is classified as::

- ***Process water***: Water used by industries to produce a product or affect a process is known as process water.
- ***Potable water:*** Potable water is the drinking water. It contains the impurities that are safe for human health. Any water used in the production of wine, preparation of wine additives, and the washing through of lines and equipment should be of potable standard and meet all legal requirements. Where water is sourced from an 'uncontrolled' source, that is, other than a municipal supply, it should be routinely monitored to ensure compliance with legal requirements
- ***Cooling water***: Water at low temperature used to remove heat from process equipment's like coolers etc.
- ***Hot water:*** Water at high temperature used to heat within process systems is known as hot water.
- ***Fire hydrant:*** Water used for extinguishing fire in emergency fire lines in known as fire water.
- ***Boiler feed water:*** It has fewer amounts of impurities that can cause corrosion within Boiler vessel and Equipment using that water***.*** Some special compounds are also added into it in order to get specific properties e.g. Anti-Foaming Agents.
- ***Waste water:*** It contains a lot of impurities and effluents.

3.3. ***Compressed air:*** Compressed air is supplied in industrial sites for two main uses.

- ***Plant air:*** For general use
- ***Instrument air:*** for control systems, pneumatic devices, etc.

3.4. ***Inert gas:***

Generally used for making system inert or process works under inert condition. The main inert gas used in industry is Nitrogen, but Argon & Carbon-Dioxide are also used. Inert gases are used for Purging and Blanketing***.*** Purging is done to exclude air prior to start up, or to drive out hydrocarbons on shutdown etc.

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

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

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

Information Sheet 4- identifying and control potential health and safety hazards

4. **Common hazards in the winery industry and how to reduce the risks associated with these hazards**.

hhjjhjjnkkljkljk

- **Overexertion (back injuries)**

One-third of injury claims in wineries result from overexertion, and most of these (80%) involve the back.

Prevention

Use the following safe lifting techniques:

- ✓ Place your feet apart for good balance.
- ✓ Bend your knees.
- ✓ Keep the load close to the center of your body.
- ✓ Use smooth, gradual motions.
- ✓ Avoid twisting your back.

4.1.1. Unguarded machinery

Common equipment such as electrical tools can cause serious injuries. Guarding, when used properly, can protect workers from serious cuts, crushing injuries, fractures, and amputations.

Prevention

Reduce the risk of injury by following these guidelines:

- Make sure all guards are in place before using equipment.
- Do not wear loose clothing or jewelry near equipment with moving parts.
- Keep long hair contained.
- Check manufacturers' instructions for safe use.

- Retro fit older equipment with guards whenever possible.

4.1.2. Machinery not locked out

Equipment that starts up unexpectedly, especially during cleanup or maintenance, can cause serious injuries.

Prevention

- Reduce the risk of injury by following these guidelines:
- Unplug equipment before doing cleanup, maintenance, or repairs.
- If the equipment is hardwired, follow the specific lockout procedure for that equipment

4.2. Eight components of a health and safety program

A health and safety program consists of eight basic components that will help prevent accidents and injuries from happening, as well as help deal with any incidents that do occur. These eight components include the following:

Hazard identification and risk control: - Determine which hazards are present in the workplace and take steps to eliminate or minimize them.

Safe work procedures:-Describe in writing how to carry out specific tasks safely.

Orientation, education, training, and supervision: - Prepare workers for the job, and make sure they continue to work safely. This is particularly important for young workers and new workers.

Safety inspections: Identify workplace hazards so that they can be eliminated or controlled.

Incident investigation: Find out why an accident or injury occurred so the causes can be corrected.

Health and safety meetings: - Communicate with workers and supervisors, and raise any concerns about health and safety.

First aid: - determine what level of first aid is required for your workplace, and make sure everyone knows how to deal with injuries on the job.

Records and statistics: Maintain documentation to help identify recurring problems and ensure that hazardous conditions are corrected

4.3. Applying environmental guide line

Environmental responsibilities of staff in food processing what to expect from a food safety inspection.

Your responsibilities for keeping food safety to eat when your start up a food business, you must register with the environmental health service at your local council at least 28 days before opening registration is free of charge. When you register your business with your local council, they will advise you on safety requirements and inspections.

Good housekeeping practices and routine inspections also are beneficial in keeping the workplace hazard-free. By taking these comparatively simple steps, management can be sure that all equipment is in good operating condition and properly stored. Emergency equipment such as fire extinguishers and eyewash stations also should be inspected for proper operation. The large tanks used for mixing ingredients, which need to be entered and cleaned routinely, are considered

4.3.1. Supervisors responsibility:-

- Ensure the health and safety of workers under your direct supervision.
- Know the requirements of the Regulation that apply to the work you are supervising.
- Ensure that workers under your direct supervision are informed about all hazards in the workplace and that they comply with the Regulation.
- Consult and cooperate with the joint health and safety committee (or worker health and safety representative).
- Cooperate with Work Safe and its officers

4.3.2. Workers responsibility

- Take reasonable care to protect your health and safety and that of other persons who may be affected by your actions.
- Comply with the Occupational Health and Safety Regulation and other legal requirements.
- Follow established safe work procedures.
- Use any required personal protective equipment.
- Refrain from horseplay or similar conduct that may endanger others.
- Do not work if you are impaired (for example, by drugs or alcohol).
- Report accidents and other incidents (such as near misses) to your supervisor.
- Report to your supervisor or employer any of the following:
  - ✓ A hazard that might endanger others
  - ✓ A problem with protective equipment or clothing
  - ✓ A violation of the Regulation or other legal requirements

- Cooperate with your joint health and safety committee (or worker health and safety representative).
- Cooperate with Work Safe and its officers

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

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

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

Information Sheet 5- Selecting, fitting and using personal protective equipment

Personal Protective Equipment (PPE) is used for protection from the hazards identified in your workplace and refers to protective *clothing, helmets, goggles, or other garments or equipment* designed to protect the wearer's body from injury.

The purpose of personal protective equipment is to reduce employee exposure to hazards when engineering and/or administrative controls are not feasible or effective to reduce these risks to acceptable levels. Any item of PPE imposes a barrier between the wearer/user and the working environment.

5.1. Using personal protective equipment's

Where it is not possible for emissions to be controlled at their source, or removed or reduced through effective ventilation, extraction or diversion, the use of personal protective equipment (PPE) as a final measure must be considered to ensure safety.

Selection and use of PPE requires careful consideration, as there are many different types that reduce the risk of injury of contact or exposure to a hazard.

Incorrect use of PPE, or purchasing inappropriate PPE, can contribute to serious workplace incidents.

PPE that is uncomfortable, restrictive or heavy may create secondary hazards, and, as result, constant supervision may be necessary to ensure it is used effectively.

Personal protective equipment (PPE) should be the last line of defense in a health and safety program. Before considering PPE, first try to eliminate or minimize the risks using other means for example, by using less hazardous chemicals or by modifying work processes or equipment. If PPE is required, ensure that it is available to all workers who need it. Employers must also ensure that workers are trained in the use of any relevant PPE, and that they use it according to their training. The following table lists various types of PPE and their uses in the winery industry. Certain tasks require the use of more than one type of PPE. For example, workers may need to dilute concentrated, corrosive chemicals such as cleaning agents before using them. PPE required for this task may include face and eye protection such as face shields or goggles, as well as skin protection such as gloves. For the exact type of PPE to use, check the material safety data sheet (MSDS) for the chemical.

Table5.1: some examples of PPE and their uses

Body parts	Type of PPE	Uses
Eyes	Safety goggles and face shields	Working with chemicals that may splash
Hands	Chemical-resistant gloves	Cleaning with or handling chemicals
Ears	Hearing protection	In bottling areas and around machinery
Feet	Non-slip footwear	Working in and around tanks

5.2. Requirement for PPE

To ensure the greatest possible protection for employees in the workplace, the cooperative Efforts of both employers and employees will help in establishing and maintaining a safe and healthful work environment.

Some typical personal protective equipment (PPE) are listed below. (Musk for respiratory protection from chemical, face shield for face protection from splitting objects, hand glove to protect hand, eye goggle to protect eye, hair net to cover hair, ear plug, to protect ear from noise hazard)

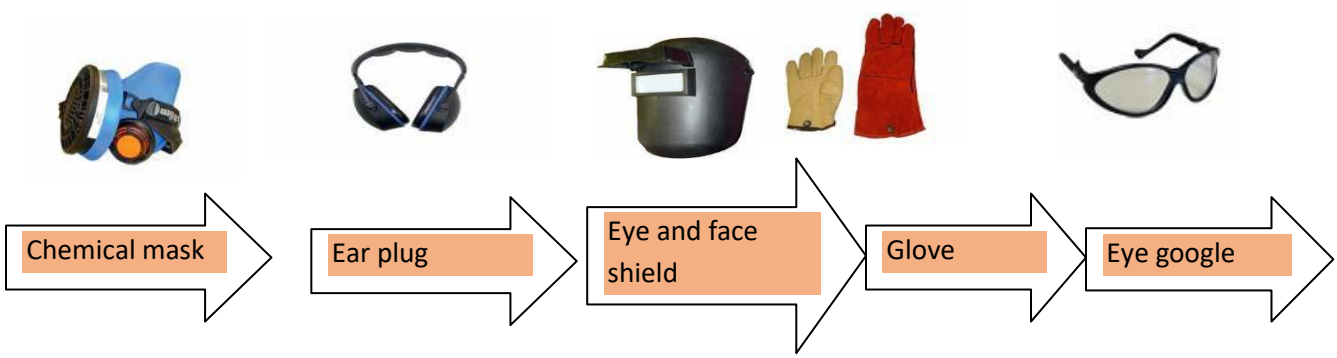

Fig. 5.1: typical examples of PPE (personal protective equipment)

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

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

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

Information Sheet 6- Checking equipment

6. Checking equipment

Most of the equipment used in wine clarification is mostly associated brush strainers, tanks, decanter, hydro-cyclones, motor pumps flotation tube, solids extraction constant pressure valves as a component in-line equipment and all this equipment's are illustrated in a single figure

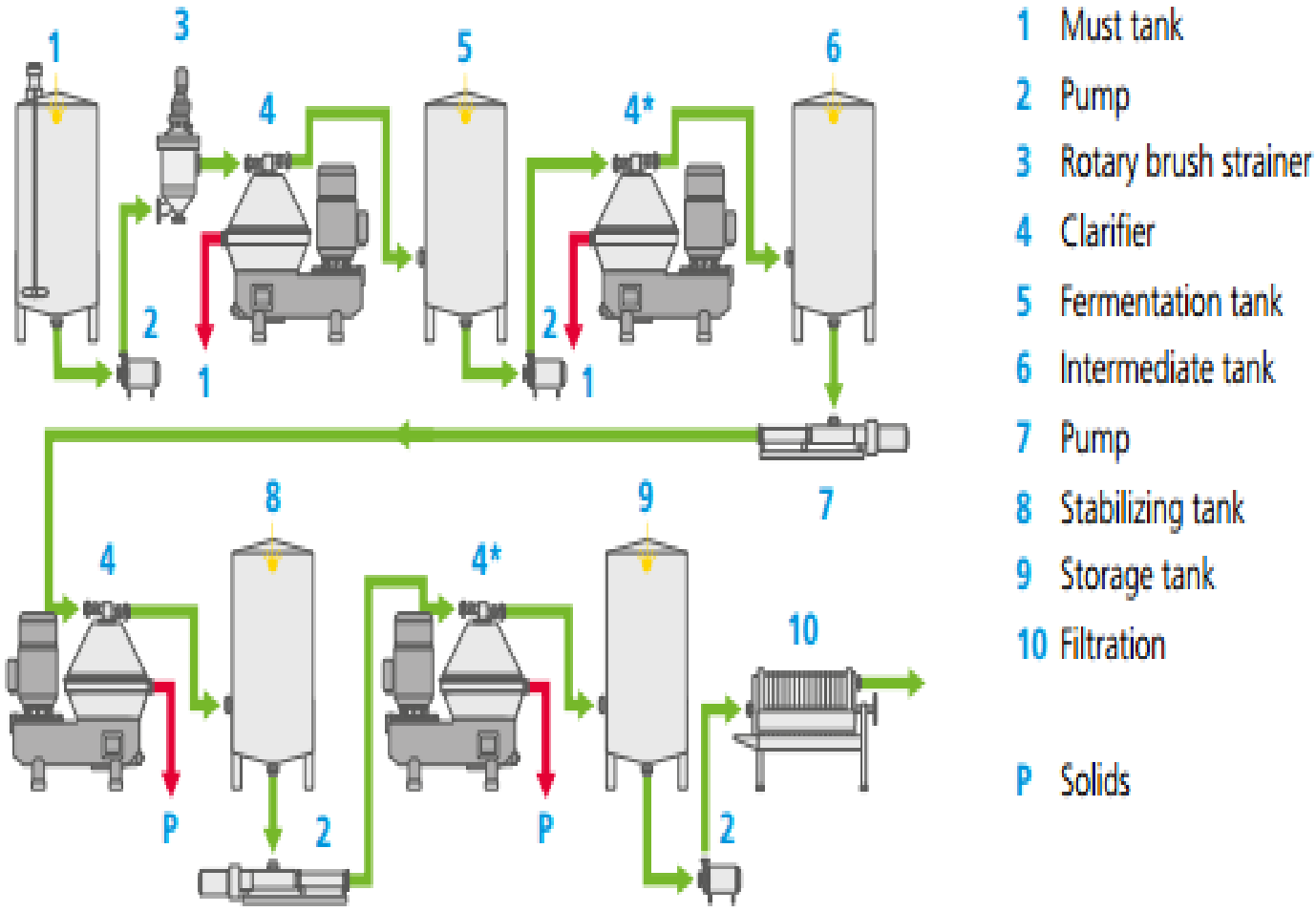

Fig.6.1: multi functionality of clarifier/centrifuge (xxxxx)

Monitoring equipment is an activity which consists (2.6)

- Checking
  - ✓ hygiene and sanitation standards,
  - ✓ safety standards
  - ✓ pre-start requirements are met
  - ✓ that equipment is operational

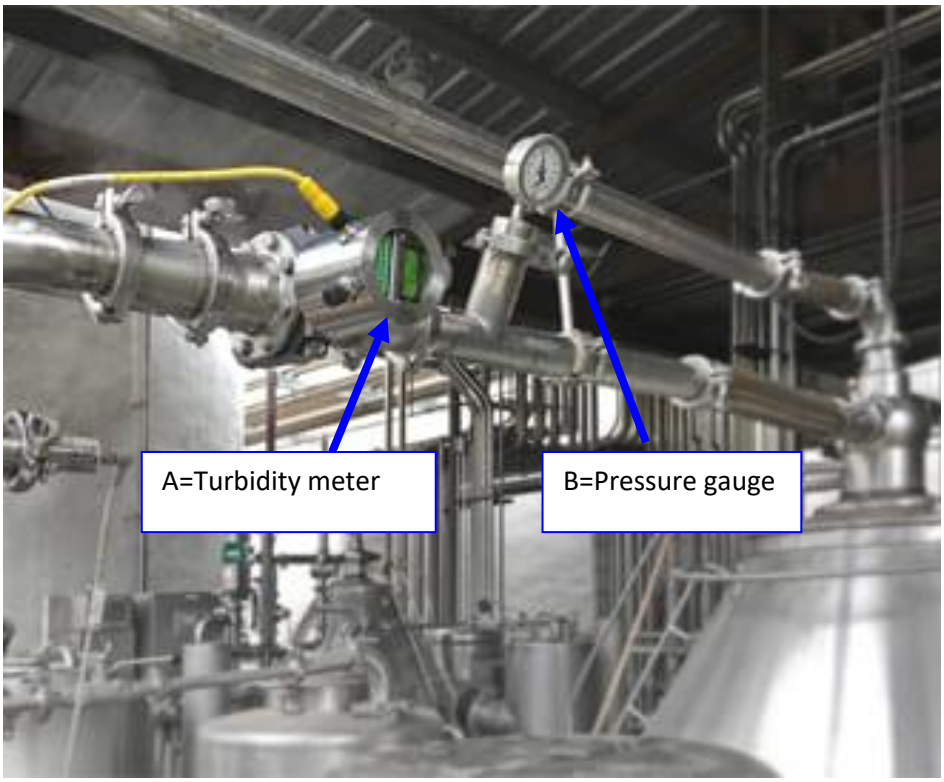

Fig. 6.1: checking centrifuige on line instrument

6.1. Pump:

Pumps are used in wineries to move must, lees, juice and wine. Wine contains significant amounts of acid, so any pump used for wine must be made of corrosion resistant materials. A variety of pump styles are produced to meet the requirements of different winery applications. Transfer pumps are used to transfer juice or wine for filtering and for bottling. Most transfer pumps are either rubber impeller "Jabsco" style pumps or centrifugal pumps. Rubber impeller pumps are generally preferred for moderate flow rate applications when the pressure heads are higher. Centrifugal pumps are generally preferred when large flow rates at moderate pressures are needed.

6.2. Hydro cyclones and brush strainers

6.2.1. Rotary brush strainers: Rotary brush strainers operate continuously. Air intake is avoided by its closed design. Raw must is fed into the strainer through the inlet. Solids collected on the inside of the cylindrical, perforated strainer insert are pushed down into the conical sediment holding space by rotating scrapers. They can be discharged periodically through the solids outlet. A tangentially arranged flushing connection serves for cleaning the strainer. Suitable rotary brush strainers are available in various sizes for all self-cleaning clarifiers.

6.2.2. Hydro cyclones: Hydro cyclones are centrifugal separators which fnd application, among other things, for separation and classification of solids suspended in liquids. In the wine industry they

are used for de-sanding the must in order to protect the valuable clarifier bowl from wear as well as for tartrate separation. Because of their closed design (sealing of lower part by so-called grit pot), O2 intake and must losses are avoided. Sand-containing must enters the hydro cyclone at the required pressure “p” through the inlet. Sand particles pass through the apex nozzle into the grit pot. The de-sanded must leave the hydro cyclone through the outlet. Sand particles are discharged discontinuously through the valve. The opening process can be carried out manually or automatically with the aid of a timer.

Hydro hermetic (liquid seal) clarifiers minimize oxygen pick-up in the must. The must is discharged under pressure by a centripetal pump, whereby, in addition, a stationary disc submerged in the rotating liquid creates a liquid seal.

To keep coarse solids out of the clarifier and to obtain a certain pre-clarification in the feed liquid, a rotary brush strainer is installed before the clarifier. A hydro cyclone in the clarifier feed line is recommended to remove high amounts of sandy particles in the must. This reduces erosion of the bowl's wear parts.

Must clarification after screw press

Advantages

- Improved quality by fast removal of solids immediately after pressing (short contact time).
- Undesirable solids, such as insecticides, de-acidizing sediment and others do not reach the

Fermentation stage.

- Production of clear quality wines
- Efficient pre-clarification permits controlled fermentation with pure yeast
- Substantial savings in tank space, labor and time compared with natural tank sedimentation.
- In warm climates savings in cooling capacity due to the immediate removal of solids
- Continuous processing
- High yield due to minimized product losses Less SO_2 requirement
- Oxygen transferring enzymes are removed with solids
- Less fining agents required in the wine
- Fast removal of the solids helps to achieve a controlled fermentation process. This enhances the development of the wine (in warm climates saving in cooling capacity).

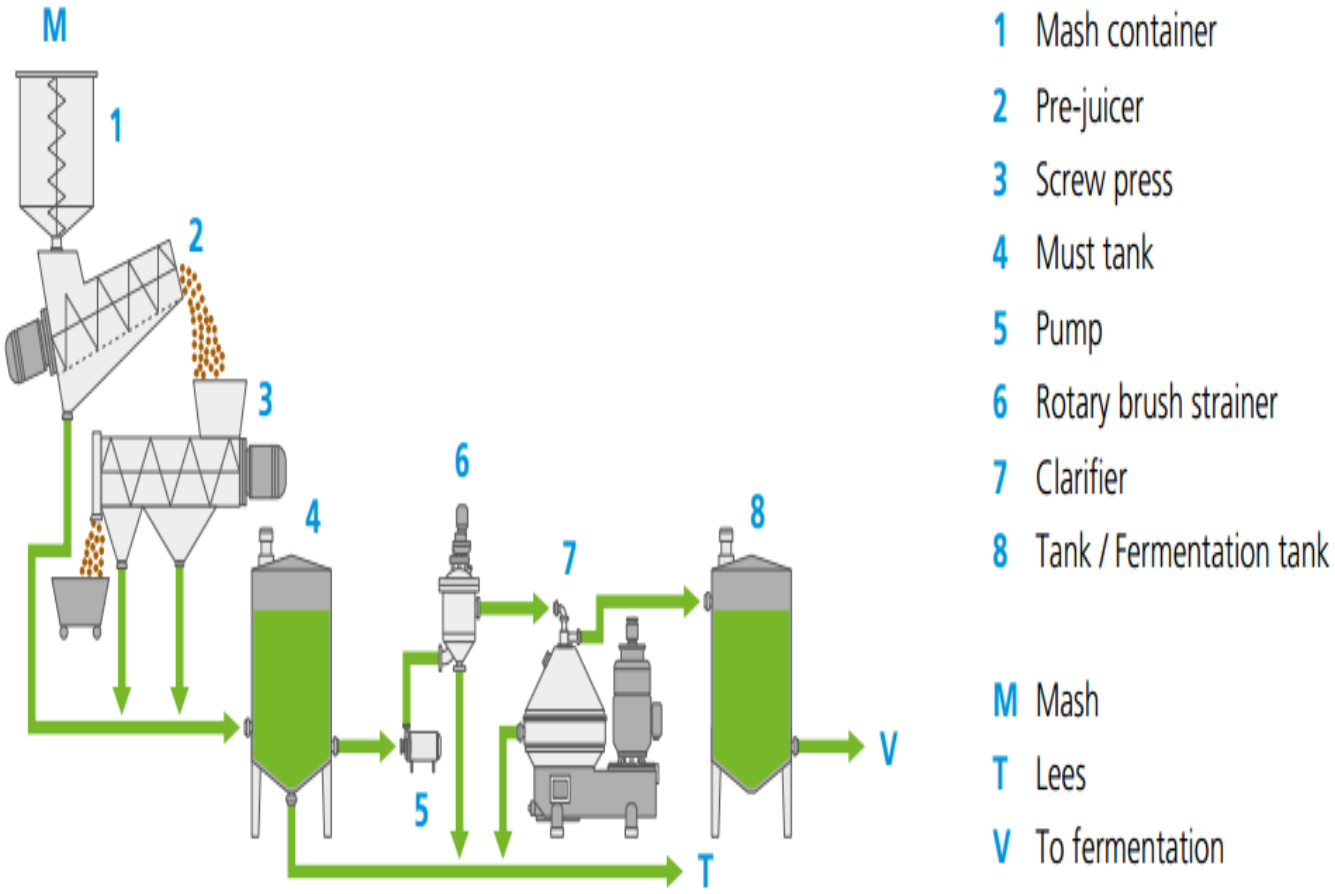

Fig 6.2: Must clarification after screw press

6.3. flotation tube and solids extraction constant pressure valves

In this process, the clarifier is combined with a flotation system to clarify the must. A flotation system is installed in the outlet of the clarifier for this purpose. Sterile air and gelatin are added directly preceding the constant pressure valve. High discharge pressure of 5 – 6 bar at the outlet of the clarifier is employed, which is necessary to dissolve oxygen in adequate quantities and as small bubbles in the product. 2 – 3 g /hl of gelatin have proved to be the optimum quantity to achieve an adequate flocculation. Around 60 – 90 l /m3 has been found to be a sufficient air volume for flotation. In the process, the fine turbid phase, remaining in suspension directly after the clarifier, is largely separated by flotation. Equally, solids capable of centrifuging which have not been extracted by the clarifier due to the higher capacity are also floated. The foam rising in the tank after depressurization is completely stabilized by the floated solids and forms a distinct separating layer to the clear phase. The separation of the turbid phase from the polished must after drainage can be conducted very accurately. The tank is drained from the bottom towards fermentation. Stable foam remaining in the tank is sprayed out. As the

turbid phase is dry and the clear phase can be drained as far as the definite separating layer, further processing of the turbid phase is unnecessary.

Fig. 6.3: floatation tube and solids extraction constant pressure valves

6.4. clarification of sparkling wine

Removal of residual yeas finished still wines (champagne stock) are used to produce sparkling wines. Some of these wines still contain residual yeast which is removed by self-cleaning clarifiers.

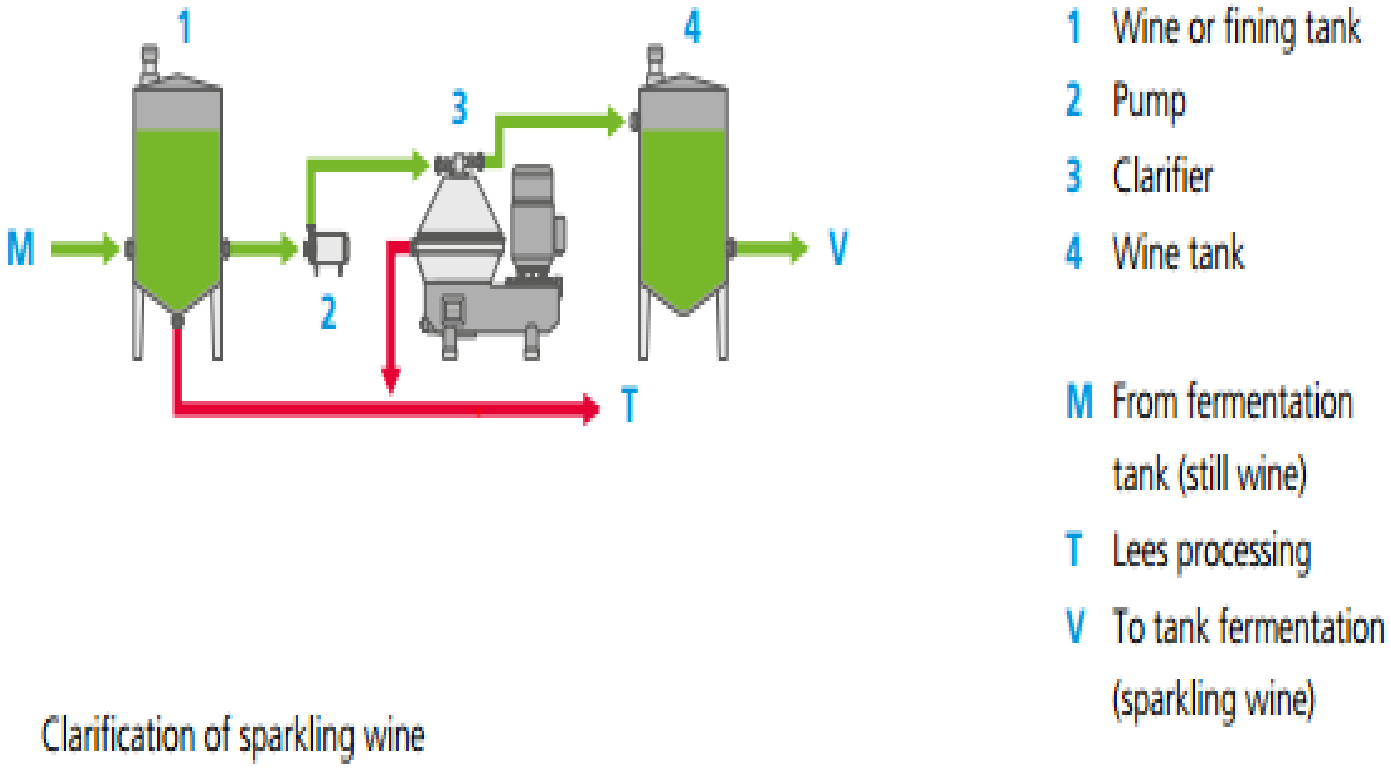

Fig 6.4 : clarification of sparkling wine

6.5. Recognizing deviations of variables

Source of variation or deviation arises from the following points

- Equipment production outputs: equipment should be wooden or stainless steel
- Equipment operating conditions: operating equipment and processing work shop housekeeping should be net and in a good hygienic condition
- Operating parameters like temperatures and pressures: process

6.6. Equipment adjustments and repairs requirement

Before maintenance is accomplished, where adjustments and repairs are required, the following precautions shall be taken.

- The equipment or machine shall be run to a location where it will cause the least interference and is most accessible.
- All controllers shall be checked to assure that they are in the off position.
- If the equipment is electrically powered, the main or emergency disconnect or switch shall be opened and locked in the open position.
- The facility specific lockout/tag out procedures shall be strictly followed. Effective isolation of the energy source shall be conducted.

- Effective warning signs, guards, and barriers shall be installed where overhead maintenance work creates a hazard or where interference with another crane or another crane's electrical conductors could occur.
- Only trained personnel shall work on energized equipment when adjustments and test are required.
- After maintenance work is completed and before returning to service:
  - ✓ Guards shall be reinstalled.
  - ✓ Safety devices shall be reactivated.
  - ✓ Replaced parts, tools, rags, and debris shall be removed.
  - ✓ Maintenance equipment shall be removed.
  - ✓ All locks and tags shall be cleared and removed.
  - ✓ All hazardous conditions and discrepancies disclosed by inspection or operation shall be corrected before resuming normal operation.
  - ✓ Adjustments or replacements of parts shall be made to assure the correct function of all operating mechanisms, including components such as limit switches, control systems etc.

6.7. Testing equipment's

Testing Keep dated reports of operational tests, rated load tests, and manufacturers' certification, as applicable, as long as the device is available for use. Before initial use, load test and inspect all new, altered, modified, repaired equipment devices.

An operational test also should be performed. Rated load tests shall be done under the direction of a qualified person.

A written report furnished by such person confirms the specific equipment operation.

The load rating should not be more than 80 percent of the maximum load sustained during the test.

Test loads shall not be more than 110 percent of the rated load unless otherwise recommended be the manufacturer.

The manufacturer furnishes a written statement, signed and stamped by a registered professional engineer, certifying its structural and operational integrity and that it conforms to the specific requirements.

6.8. Returning equipment to services

After assuring the conditions of equipment, it should be returned to the original operation stage to continue production.

6.9. Ensuring equipment that meets normal operating requirements

While you are going too restarted to operate that equipment, be sure which fulfil the working parameter requirements and get a confirmation from the technicians.

Working parameters to be monitored include:-

- equipment performance (e.g. speed, output, variations)
- equipment component performance
- sequences and timing of operation

6.10. Confirm equipment status and condition e (2.5)

To confirm the status and condition of equipment, it is necessary to consider:

- lubricating or hydraulic fluid leaks
- cleanness of receiving vessels
- wine clarification operations (availability and schedule)
- setting speed of centrifuge
- attaching hoses and opening valves
- setting pumps and lines from collection trays into receiving tanks
- product leakage

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

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

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

Information Sheet 7- setting process parameter for clarification

7. Setting process parameter for clarification process

Basic operating parameters to be adjusted during clarification of wine:

- In feed flow: should be between 180-250 hl/hr.
- Amount of centrifugal pressure: should be 2-9 bar
- Centrifugal speed revolution(rpm) : should be for 6000-10000rpm
- Pumping speed of: should be proportional with the in feed flow.
- Frequency of sludge discharging :in each 15 minutes sludge should be discharged
- Purging of inert gases :purging Co_2 gases within 5 minutes for 10 seconds
- Valve opening and closing timing

All this important parameter determine the final appearance of clarified wine property like:

- Removal of yeast and partial removal of bacteria
- Removal of complex agent and hence reduction turbidity
- Inhibition of crystallizations
- Increasing capacity of filtration by 75%

All centrifugal treatment does not affect the entire quality or chemical composition of wine like:

- acidity (total or volatile),
- pH,
- alcohol,
- sugars
- extract content, including the content of specific acids as malic, tartaric and lactic

Self-Check – 7	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

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

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

LG #32	LO# 2: Operate and monitor the clarification by separation (centrifugation) process

Instruction sheet

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

Starting up crushing process

- Starting up clarification process
- Monitoring control points to confirm performance
- Identifying work place hazards
- Confirming clarified product to the specification
- Checking equipment operating conditions
- Identifying, rectifying, and or reporting out of specification
- Monitoring clarification 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**:

- Startup clarification process
- Monitor control points to confirm performance
- Identify work place hazards
- Confirm clarified product to the specification
- Check equipment operating conditions
- Identify, rectify, and or report out of specification
- Monitor clarification process

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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- Starting up clarification process

At the end of the primary fermentation, the new wine contains

- many spent yeast cells,
- several different types of bacteria,
- tartrate crystals,
- small fragments of grape tissue,
- Bits of dirt, etc.

All these particles interact with light that passes through the new wine. The particles absorb or scatter the light, and they give the wine an

- opaque,
- turbid appearance

Gravity will slowly pull most of these particles down to the bottom of the wine container. Then the winemaker can decant the clear wine off the sediment. The larger sized particles may settle out in a day or two, but smaller particles may take several weeks to fall. Some suspended material may be so small it never completely settles out of the wine. After gravity has removed most of the impurities from the wine, the winemaker may add a “fining” material to help the settling process. Alternatively, most commercial winemakers would choose to filter the wine and mechanically remove the remaining particles. At this stage of its evolution, the wine may be clear and bright, but the wine probably is not completely stable. In other words, the wine may not remain in a clear condition over an extended time.

Most wines contain excessive amounts of protein and potassium hydrogen tartrate. When wine is stored under certain conditions, the protein and the tartrate can precipitate out of the wine and produce a haze or sediment. Any white or blush wine will probably be a total loss if either of these materials precipitates after the wine has been bottled. Wine stability is very important to the winemaker because of the protein and tartrate problems. Several techniques have been developed to remove excessive amounts of protein and tartrate from wine, and these procedures are part of the normal winemaking process. After the excess protein and tartrate materials have been removed, the wine will be chemically stable. Then the winemaker can continue the winemaking process with reasonable assurance that the wine will remain clear and bright after it has been bottled.

Large quantities of carbon dioxide gas are produced during primary fermentation, and considerable turbulence in the wine is produced as the bubbles rise to the surface. When fermentation is finished,

bubbles are no longer produced, and the wine becomes still. When the wine is still, gravity slowly pulls the suspended material to the bottom of the container. Settling time depends on the size of the suspended material, and smaller particles require more time to settle than larger particles. Pulp and skin fragments settle out of small containers in just a few days. Yeast cells are much smaller, and a week or more is usually required for spent yeast cells to fall 24 inches. Bacteria are so small they never completely settle out of the wine. So wine makers should consider potential source of haze for the cause of turbidity.

1.1. Types of hazes

Grape particles and fragments, microbes, protein, tartrate, phenolic polymers, polysaccharide and metals cause most wine haze problems. Wine clarity problems are not mysterious, and unless a wine has been grossly contaminated by the addition of some foreign material, wine haze is normally the result of one or more of these factors. Sometimes a winemaker will encounter a haze that is particularly difficult to remove, but these cases are rare. Identifying the offending material and then acting accordingly solves most haze problems.

1.1.1. Particles and Fragments

Grape particles seldom cause long-term haze problems. Even the smallest bits and pieces of grape pulp and skins are large enough to settle out of wine in a few weeks. However, ML fermentation can produce enough carbon dioxide gas to cause a significant turbulence in a small tank, and the turbulence prevents the smaller particles from settling out. ML fermentation can continue long after the sugar is gone, so winemakers check for the presence of carbon dioxide gas to make sure all fermentations have been completed. When the gas is gone, the particles will settle out, and after the wine has been racked a time or two, it will be clear and bright.

1.1.2. Microbial Hazes

Yeast cells are several microns in diameter, and if the wine is not disturbed, the yeast cells readily settle to the bottom of the container in a few weeks. Usually a little patience will take care of yeast haze problems, but the situation is not so simple with bacterial hazes. Bacteria are 10 to 100 times smaller than yeast cells. Bacteria are so small they never completely settle out of wine. Large wineries have sophisticated analytical equipment in their testing labs, but even then, some types of bacteria are difficult to identify and treat. Fortunately, many wine bacteria are sensitive to sulfur dioxide, and most bacterial problems can be prevented simply by maintaining the free sulfur dioxide content of stored wine at 30 milligrams per liter. Once established, a bad bacterial haze can be difficult to overcome. The infected wine can be pasteurized, or the wine can be passed through a sterile membrane filter. Both techniques are effective, and both are common wine industry procedures. Unfortunately, few home winemakers

have the sophisticated and expensive equipment needed to apply either of these treatments. Since gross bacterial infections are difficult to handle, home winemakers should maintain strict hygienic winemaking conditions and they should always maintain reasonable amounts (20 to 30 mg/l) of free sulfur dioxide in their wines. Taking these two simple steps will reduce the occurrence of bacterial infections to a very low level. Sometimes home winemakers can rent sterile filtration equipment, and sterile filtration might be a feasible way of saving a particularly pleasing wine. Nevertheless, the equipment and sterilization procedures are complicated. For the average home winemaker, prevention is the most effective way of dealing with bacterial problems.

1.1.3. Protein Grapes

Contain small quantities of protein, and some varieties (Sauvignon Blanc) sometimes contain large amounts. Protein is carried over from the grapes into the wine during fermentation. Originally, the protein molecules are much too small to be visible in the wine. However, under certain conditions protein molecules link together (polymerize) and grow larger. After many protein molecules have linked together, the protein particles are large enough to be visible, and the particles are too large to remain suspended in the wine. This growth process is very slow at normal cellar temperatures, but when wine becomes warm, the protein molecules grow more rapidly. At temperatures of about 120 degrees, protein molecules can link together and form large particles in a short time. A bad protein haze is very unsightly in a bottle of white or blush wine. The protein particles are light and fluffy, and they produce a swirling cloud when the bottle is disturbed. When white or blush wines are subjected to warm storage conditions, protein hazes can form quickly, and all commercial white and blush wines are specifically treated to remove the excess protein before bottling. Winemakers call protein haze hot instability because warm storage conditions trigger the phenomena. Leaving a bottle of Sauvignon Blanc in a car trunk on a hot summer day can easily produce a graphic demonstration of hot instability. Excess protein seldom causes stability problems in red wine. Red wines contain phenolic compounds that react with the protein during primary fermentation, and the excess protein precipitates out of the wine. White and blush wines contain very little phenolic materials, so the winemaker must use a special treatment to remove the excess protein from these wines.

1.1.4. Potassium Bitartrate

Grapes contain several organic acids including tartaric acid, and they contain potassium. Vines manufacture tartaric acid through the photosynthesis process, and the vines obtain potassium from the soil. Potassium reacts with tartaric acid and forms a material called potassium bitartrate. Potassium bitartrate is a clear, crystalline material, and grapes always contain some of this material. Cooks usually

refer to potassium bitartrate as cream of tartar, but most winemakers call this material “tartrate.” Potassium bitartrate has several interesting physical properties.

- Only small quantities of this material can be dissolved in grape juice.
- After grape juice ferments and alcohol accumulates, even less potassium bitartrate is soluble in the water-alcohol mixture.
- The quantity of potassium bitartrate dissolved in wine is strongly dependent upon temperature, and cold wine cannot hold as much potassium bitartrate as warm wine

In combination, these three properties produce an interesting winemaking problem. Generally, grape juice contains all the potassium bitartrate it can hold when the grapes are picked. Alcohol begins to accumulate when the grapes are fermented. As the alcohol concentration increases, the new wine becomes saturated, and potassium bitartrate precipitates out of the wine. As fermentation continues, more alcohol is produced, and more tartrate is forced to precipitate out of wine. New wine is over saturated with potassium bitartrate when fermentation is complete, and the tartrate continues to drop out of the solution. However, tartrate precipitation is very slow at normal cellar temperatures. The tartrate crystals often continue to precipitate for a year or more, so potassium bitartrate causes serious long-term stability problems for the wine industry. The following example illustrates a common tartrate stability problem. A new white wine is clarified and aged for several months. The wine is then filtered with a 0.45-micron membrane and bottled. The newly bottled wine is clear and bright, but the wine is still nearly saturated with potassium bitartrate. Ultimately, a consumer puts a bottle of this wine into a refrigerator for a few hours before it is served. The wine cools rapidly in the refrigerator, and potassium bitartrate precipitates out of the cold wine. As tartrate drops out of solution, suspicious looking crystals are formed in the bottle, or haze forms. Tartrate hazes are very unsightly, and sometimes the consumer mistakes the tartrate crystals in the bottle for glass particles. In any case, the consumer is unhappy, and the winemaker is embarrassed. All commercial white and blush wines are cold stabilized sometime during the winemaking process to remove the excess tartrate material before the wine is bottled.

1.1.5. Phenolic Polymers

Phenolic compounds are present in wine in small amounts. The quantity may be small, but phenolic materials are very important wine ingredients. Phenolic compounds are responsible for color, bitterness, astringency and some odors and flavors. Many phenolic compounds polymerize just like protein molecules, and these phenolic molecules combine and slowly grow larger. Phenolic molecules carry an electric charge, and the molecules repel each other in the wine. Large phenolic molecules can remain suspended in the wine for a long time because of the electric charges. Since phenolic molecules remain

suspended for a long time, haze and bottle deposit problems often occur a few months after red wines are bottled unless the excess phenolic material is removed. To avoid phenolic problems, experienced winemakers remove excessive quantities of phenolic materials from red wines by fining or filtration.

Any protein fining material such as gelatin, casein, egg white or isinglass can remove phenolic materials from wine, and many red wines are lightly fined with egg whites or gelatin several weeks before bottling time. The quantity of fining material used is small, so the fining treatment does not alter other wine characteristics significantly. Practically all red wines produced commercially receive a light protein fining or a tight pad filtration to reduce bottle deposits. Making red wines completely phenolic-stable is not practical, and most red wines will show some bottle deposit when several years old. Phenolic haze problems rarely occur in white or blush wines. These wines receive practically no skin contact, so they contain very little phenolic material.

1.1.6. Polysaccharides

Polysaccharides are very large molecules consisting of many simple sugar molecules (monosaccharides) linked together. Pectin and gums are common examples of polysaccharides. Pectin is the material that makes jam and jelly solidify, and pectin often produces hazes in fruit wines. However, pectin hazes are seldom a serious problem in wines made from grapes because grapes 89 contain a naturally occurring enzyme that breaks down the large pectin molecules into smaller molecules that cause little trouble. When they do occur, pectin or gum hazes can be difficult to remove from wine. These large polysaccharide molecules often carry electric charges, and the charges help hold the molecules in suspension. Most fining materials used for wine clarification are not very effective in removing this type of haze because of the chemical nature of these materials. Filtration is not always an effective way of removing pectin hazes. Filter pads are plugged quickly by pectin and gums, and trying to filter wine with a sever pectin haze often becomes a frustrating and costly undertaking. Winemakers often use pectic enzymes instead of trying to remove pectin hazes by fining or filtration. Pectic enzymes are available commercially, and they are added to the juice or the wine to break down the large troublesome pectin molecules. Alcohol interferes with enzyme action to some extent, so sometimes pectic enzymes are more efficient when added to juice before fermentation is started.

1.1.7. Metals

Fifty years ago most winemaking equipment was made of iron or brass. Wine acids are strong enough to dissolve tiny amounts of these metals, and in the past, iron and copper hazes were common problems throughout the wine industry. Several proprietary fining materials were developed specifically to remove these excess metals from wine. Unfortunately, the effective products were based on poisonous, cyanide compounds, and great care and much testing was required when these products were used. In recent

years, the prevalent use of stainless steel and plastic materials has virtually eliminated metal haze problems.

1.2. Definitions of terms

A) Clarification:

Wine makers first impression of any wine is a visual one. Wine is seen before it is tasted, and wine is expected to be brilliantly clear and have an appropriate color. So process of obtaining appropriate wine color and clearness by removing any turbid matter (haze) is called clarification. Racking, fining and filtration are used to accomplish clarification.

B) Racking or decantation

New wines contain yeast cells, bacteria, small bits of skin, pulp, etc. These particles are pulled down by gravity, and they slowly settle to the bottom of the container. The smaller the particle, the slower it sinks to the bottom of the container. Some particles are so small they never sink to the bottom, and these particles remain suspended in the liquid. **"Racking"** is a process used to separate the clean wine from the lees (the muck on the bottom of the container). After wine has been racked two or three times, the muck will be gone, and the wine will become clear and bright.

The most simplistic definition of "racking" is the transfer of wine from one vessel to another. Or small winery, moving wine from barrel to barrel.

C) Lees: are all of the dead yeast cells and solids that settle out of the wine during the aging process

D) Centrifugation: Centrifugal separators are driven by the technique of centrifugation. Centrifugation utilizes centrifugal force to separate particles from the solution. This process is mainly employed to separate two immiscible substances existing in a solution.

E) Filtration: Filtration involves the physical retention of material on or within a fi brous or porous material. Depending on the pore size, filtration removes coarse particles with diameters larger than 100μm down to molecules and ions with diameters less than 10 3μm. However, the greater the retentive property, the greater is the likelihood of plugging. As a consequence, filtration typically is preceded by preliminary clarification, using racking, fining, or centrifugation.

F) Fining: Fining materials are added to wine to remove unwanted color, hazes, bitterness, astringency, etc. Some fining materials neutralize the electric charge on the unwanted particles, and the particles then settle out faster. Other fining materials become attached to the unwanted particles, and the larger particles then settle faster. Very little of the fining material remains in the wine when the fining procedure is done correctly.

1.3. Working principles of racking and centrifugation

1.3.1. Racking (decanting) principles

The muck that slowly accumulates on the bottom of wine containers is called lees. Clean wine is separated from the lees by a decanting process called racking. After wine is racked two or three times, it becomes clean, clear and bottle bright. Besides clarifying wine, racking helps remove other unwanted materials, so racking also contributes to long-term wine stability. Siphoning the wine off the lees with a piece of clear plastic tubing is the usual way of racking small containers like 5-gallon carboys. Barrels and drums are often racked with a small pump and plastic tubing. Wineries use 90 powerful electric transfer pumps and large diameter hoses made from food grade materials to rack their large stainless steel wine tanks. White wines are normally racked off the gross yeast lees shortly after the finish of alcoholic fermentation. These wines are racked a second time after they have been hot and cold stabilized. Red wines are often left on their gross lees until malolactic fermentation is finished. They are then racked for the first time. Red wines are usually racked two more times the first year and then at six month intervals. Most winemakers rack wines promptly (a week or so) after a fining treatment.

Fig. 1.1. racking fermented wine

1.3.2. Centrifugal Separator Working Principle

The centrifugal separator features an inlet, outlet, and separator. The liquid-solid, solid-liquid, is pumped into a cone-shaped working apparatus in the separator. The separator produces a spinning vortex, which leads to the filtration of solids from liquids. The separated solids are collected at the bottom of the separator, and they are purged from there. Generally speaking, centrifuges are classified in

sedimentation and filter centrifuges. Among sedimentation centrifuges, the disk stack, which discharges intermittently and radially, is the one used in the wine industry.

Process function is based on the fast rotating bowl (speed is about 6000-10000 rpm) in which the separation takes place (as figure 1.2a below)

- The incoming liquid (feed) enters in the centrifuge via the inlet (a)
- Where it is spun up to the speed of the centrifuge. The feed is there after led radially outward in the distributor (b)
- It is distributed to the disk stack (c). The disk stack consists of closely spaced conical discs. In order to have an efficient centrifuge, a large surface area is needed and about two hundreds discs are used. The liquid is continuously separated from the sediment as it goes towards the center of the bowl.
- When the separated liquid leaves the disk stack, it raise upwards and flow out of the bowl through a centripetal pump known as paring disk (d).
- The paring disk converts the kinetic energy of the rotating liquid, and discharges it under pressure. Backpressure should be applied and regulated (from 2 to 9 bar) by a specific device on liquid outlet according to throughput maintain the bowl full of liquid in order to limit its aeration and to avoid turbulences which can have bad impact on separation efficiency.
- Separated sediment, which is heavier than liquid, is forced towards the periphery of the bowl and collected in the sediment space (e) outside the disc stack. Discharge of sediments takes place through a number of ports in the bowl wall. Discharge occurs in an intermittent adjustable way thanks to the sliding bowl bottom. The sliding bowl bottom is forced upwards against a seal ring by a specific liquid force acting on its underside

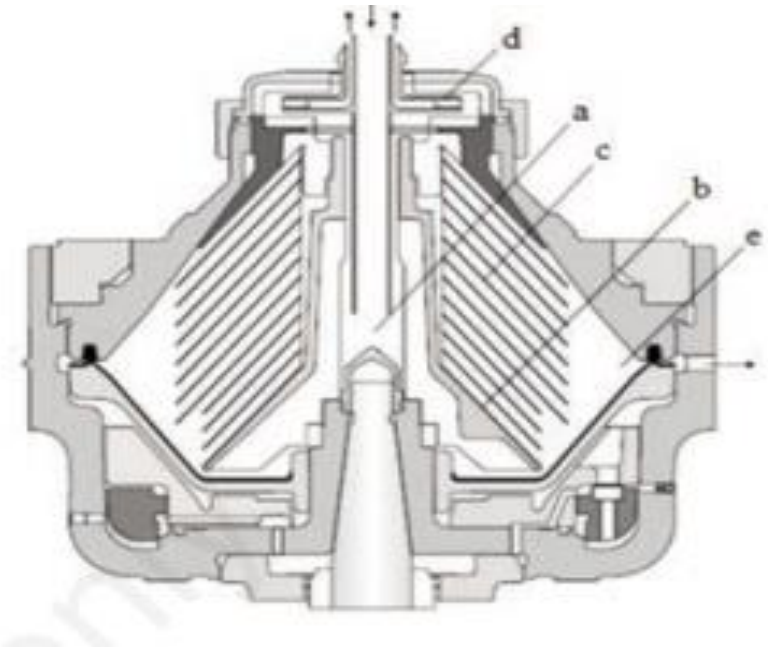

Fig. 1.2a: cross section of bowl of a disck stack centrifuge (a) inlet ;(b) distributor ;(c) disk stack;(d) pairing disk;(e) sedement space.

fig. 1.2b Alfa Lavela Hermatic Disk Bowl Centrifuge

All parameters were measured before and immediately after centrifugation. Analytical parameters like acidity (total and volatile), pH, alcohol, sugars and extract content, including the content of specific acids as malic, tartaric and lactic were analyzed.

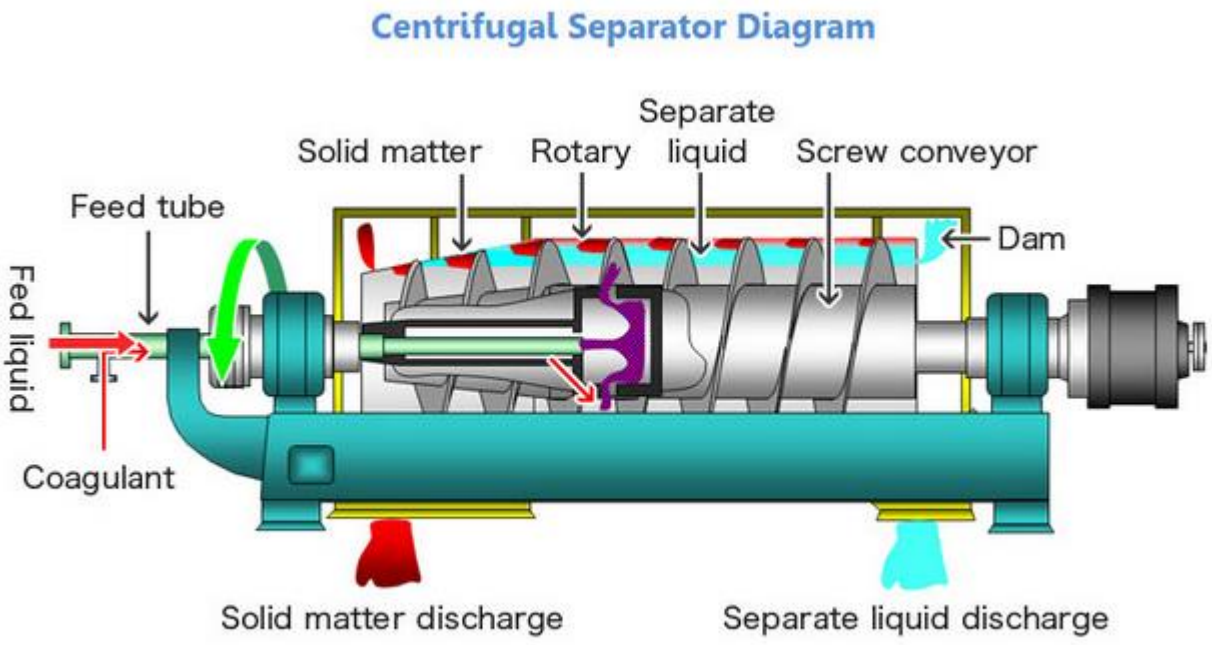

Fig.1.2c. centrifugal separator diaphragm

1.4. Advantages of Centrifugal Separators

Centrifugal separators are used in a variety of industrial applications, owing to various advantages they offer. They have a few moving parts than other separators and have no filters, bags, screens, as well as cartridges, which makes them an ideal choice for various industrial applications. In addition to their design advantages, these separators provide the following benefits:

1.4.1. Maintenance Free: The centrifugal separator is largely maintenance-free owing to the absence of moving parts or other components. It is fitted with an automatic purge valve designed to flush the debris and contaminants automatically.

1.4.2. Minimal or No Downtime: This is another major advantage of centrifugal separator water filters or centrifugal separators used in the industrial process. As the filtration is performed by the spinning of a vortex, there are no real filters involved. This means there will no accumulation of debris in filters, and there will no breakdown due to this accumulation. Also, there will no need to change the filters more often, as in the case of other liquid separators.

1.4.3. Minimal Liquid Loss: Do you know there is a little liquid loss by purging while using centrifugal separators than other filters! Typically, the users have to bear major liquid loses when cleaning sand media filters or automatic strainers.

1.4.4. High Efficiency: The efficiency of centrifugal separation is 98% .

1.5. Fining

Most white and blush wines will need to be clarified by fining with Sparkolloid. Most red wines become clear automatically. Red wines are often fined with protein materials such as a gelatin, casein or egg whites to reduce astringency. Un-flavored “Knox” gelatin, purchased at a grocery store, can be used to remove red wine astringency. One level teaspoon of dry gelatin powder for each 5-gallons of wine is an average dose. The powder should be mixed in a cup of warm water. The warm gelatin liquid should be added slowly while constantly stirring the wine. After a week or so, the wine should be racked off the fining lees. A light gelatin fining can be effective in reducing the amount of bottle deposit.

Bench tests are done on wines to decide

(1) Which fining material is best for the job?

(2) How much fining material is needed?

Tests are made by adding small, measured amounts of the proposed fining material to a small, measured quantity of the wine to be treated. Usually several wine samples are made, and each sample contains a different quantity of fining material. After an appropriate time, the winemaker examines the samples to see if the desired results were obtained.

1.5.1. Fining materials with clarification requirements

- Egg White - to remove astringency from red wine, a typical dose is 2 or 3 egg whites for 60 gallons of wine.
- Bentonite - to remove protein from white wine, a typical dose is 1 to 2 g/gal. For general clarification, a typical dose is 1 g/gal.
- Casein - to remove browning in white wines, a typical dose is 0.25 g/gal. To remove bitter taste in white wine, a typical dose is 2g/gal. To remove excess oak flavor, a typical dose is 2 g/gal.
- Gelatin - for white wine clarification, a typical dose is 0.125 g/gal. To remove bitter tastes from white wine, a typical dose is 0.25 g/gal. - For tannin reduction in red wine, a typical dose is 1 g/gal.
- Sparkolloid - for general white wine clarification, the typical dose is 2 g/gal. - used as a topping over bentonite, a typical dose is 0.5 g/gal.

1.6. Summary

High quality wine can only be made when high quality fruit is picked in optimum condition. Sulfur dioxide should be added to grapes when they are crushed. The titratable acid of the juice should be adjusted to 0.65 to 0.85 percent before fermentation. White juice should be settled over night, and fermentation temperatures should be kept below 60^{o}F. Red wine is made by fermenting the juice, pulp, seeds and skins together. Caps on red fermentations should be punched down at least twice a day. Four to seven days of fermentation time will be adequate for most red grape varieties. About 50 milligrams per liter of SO2 should be added when fermentation is complete. Wine is made stable by fining, racking and chilling. White and blush wines require both hot and cold stabilization treatments. All wine must be brilliantly clear and stable before bottling. The free SO2 level should be raised to about 30 milligrams per liter a day or two before bottling.

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

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

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

Information Sheet 2- Monitoring control points to confirm performance

2. Monitoring control points to confirm performance

During the winemaking process, the contact of oxygen with wine is a very important topic, due to this impact on wine quality. The level of dissolved oxygen during different technological treatments (pumping, filtration, racking and, obviously, centrifugation) must be taken under serious monitoring by winemakers.

Dissolved oxygen during wine centrifugation is strictly dependent on bowl design. The amount is decreased by the increasing of flowrate and of counter pressure at liquid outlet with a more important effect of this last one. With higher counter pressure or higher flow rate, with all the rest of fixed parameters in an open bowl centrifuge, the bowl is more filled by liquid with subsequent less possibility of contact with air. The operator should adjust flow rate and counter pressure with the intention to reduce dissolved oxygen and to balance it with a variation of the performance on clarification, remembering that clarification efficiency is reduced by the increasing of flow rate. The oxygen dissolved in wine by centrifugal technology is drastically reduced by bottom feed full hermetic bowl.

The slightly increase of the observed dissolved oxygen, in relation with the flow rate in a bottom feed hermetic bowl, is probably due to centrifugal pump used for feeding not really capable to maintain the proper liquid pressure at outlet. It is preferable use volumetric pump with correct outlet pressure to feed bottom feed hermetic centrifuge design.

In all observation fields, centrifugal treatment does not affect

- acidity (total or volatile),
- pH,
- alcohol,
- sugars
- Extract content, including the content of specific acids as malic, tartaric and lactic.

Results are in line with the expectations, due to the fact that centrifuge physical removes a portion of suspended solids without affect chemical composition. Compounds responsible of haze should be measured before and immediately after centrifugation.

Table 2.1: Parameters of different kinds of wines to be measured before and after clarification with disk stack centrifuge

SN	Wine type	Suspended solids (%v/v)	Turbidity (NTU)	Total bacterial count (CFU/ml)	Total colloids (g/L)	Total polyphenols (mg/hl)	Alcohol (%v/v)	Sugar (g/L)	Extract (g/L)	PH	Total acidity	Volatile acidity (g/L)
1.												
2.												
3.												
4.												
5.												
6.												

Note: NTU (nephelometric turbidity unit), CFU (colony forming unit), wine temperature should be between 15 to 17^{o}c.

Standard

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

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

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

Information Sheet 3- Meeting clarified product specification

3. Meeting clarified product specification

Clarified product fulfill the required clarification quality throughout the process by monitoring an operational parameters before and after centrifugation process, which includes

- Suspended solids
- Total bacterial count
- Total colloids
- Turbidity
- Total polyphenol
- Alcohol
- Sugar
- Total acidity
- PH
- Volatile acidity

And to get the required product specification an operator could operate and monitor operational parameters of centrifugal clarification properly like; infeed flow of unclarified product, centrifugal speed (revolution per minute), pump speed, sludge discharging frequency

Table 3.1: minimum quality parameter specification for clarified (centrifuge) wine

Reduction of turbidity (%) after centrifugation	Reduction of bacterial count	Production loss (%)	Oxidation (controlled dissolved oxygen uptake)
94-99.7%	**64-98%**	**Maximum 2%**	**Maximum 10ppb**

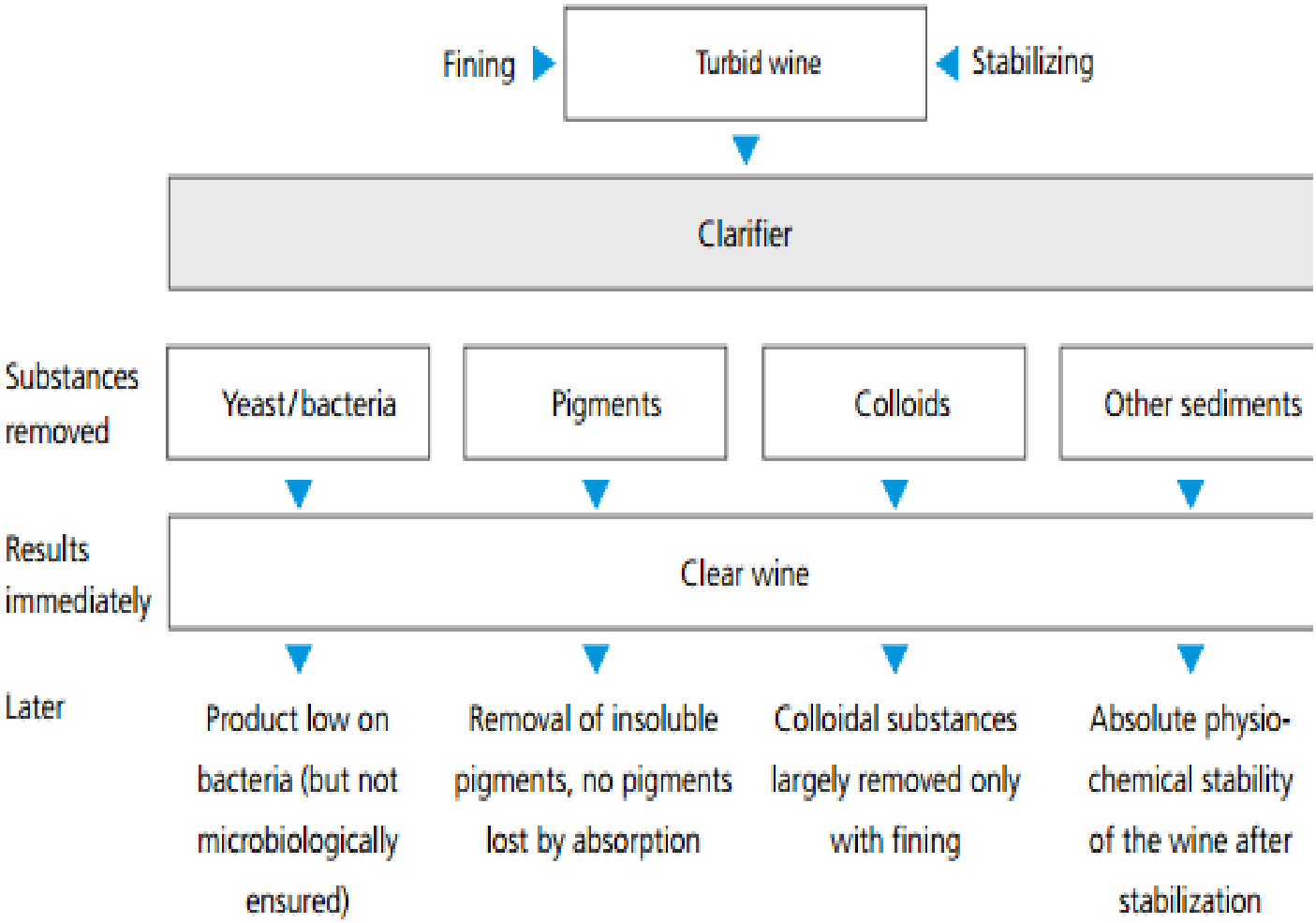

Fig. 3.1: results obtained when clarifying turbid wine in the centrifugal field

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

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

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

Information Sheet 4- Monitoring equipment

4. Monitoring equipment operation (centrifugal operation)

The aim of fining and clarification is to remove suspended and colloidal particles as well as unstable proteins or other macromolecules that can lather denature or aggregate and make the wine appear hazy once bottled. On top of the use of fining agents, the wine makers could choose to clarify wine by technologies considered traditional as sedimentation, centrifugation, filtration on plates, diatomaceous earth filtration or by recent innovative filtration technologies like cross flow microfiltration.

4.1. Process control systems (PCS)

Sometimes called industrial control systems (ICS), function as pieces of equipment along the production line during manufacturing that test the process in a variety of ways, and return data for monitoring and troubleshooting. Many types of process control systems exist, including supervisory control and data acquisition (SCADA), programmable logic controllers (PLC), or distributed control systems (DCS), and they work to gather and transmit data obtained during the manufacturing process.

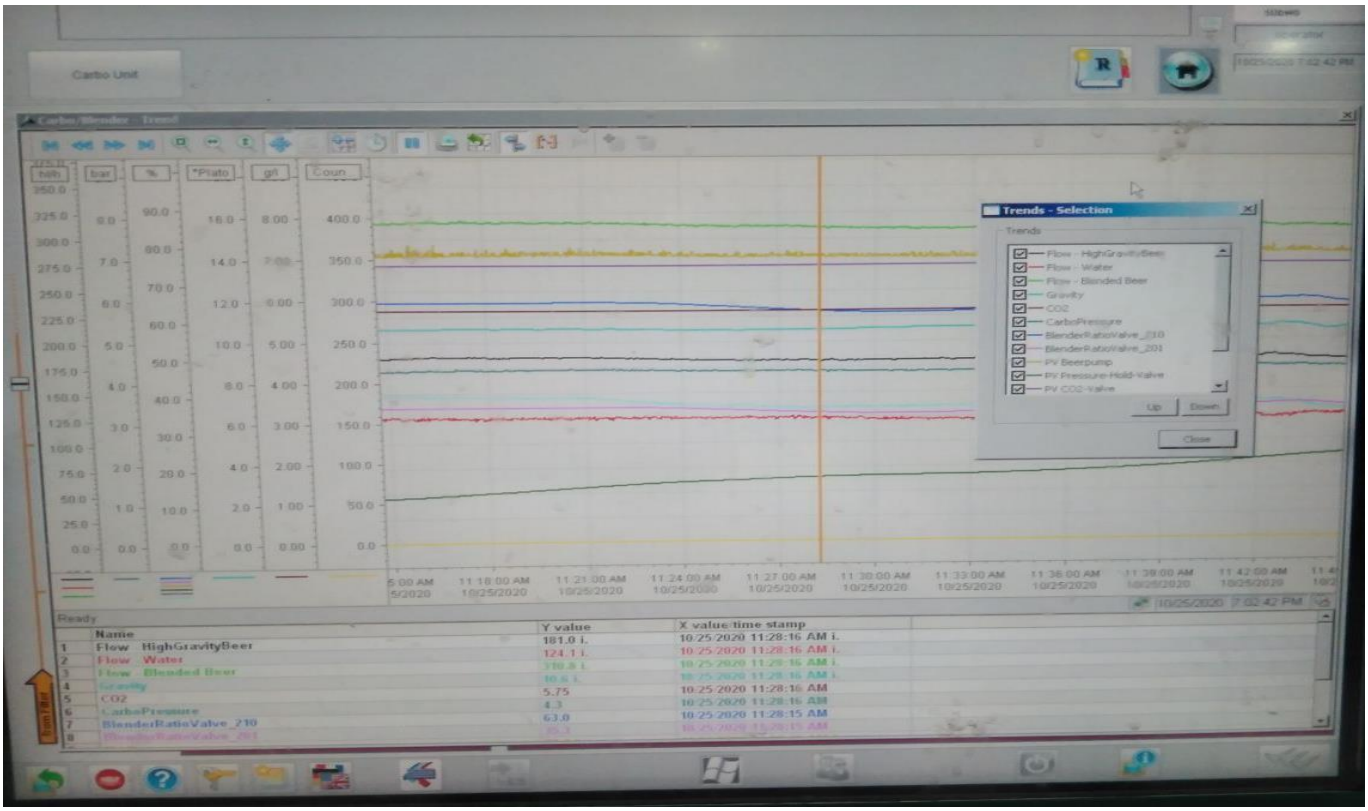

Fig.4.1a: monitoring centrifuige operational condition(SCADA)

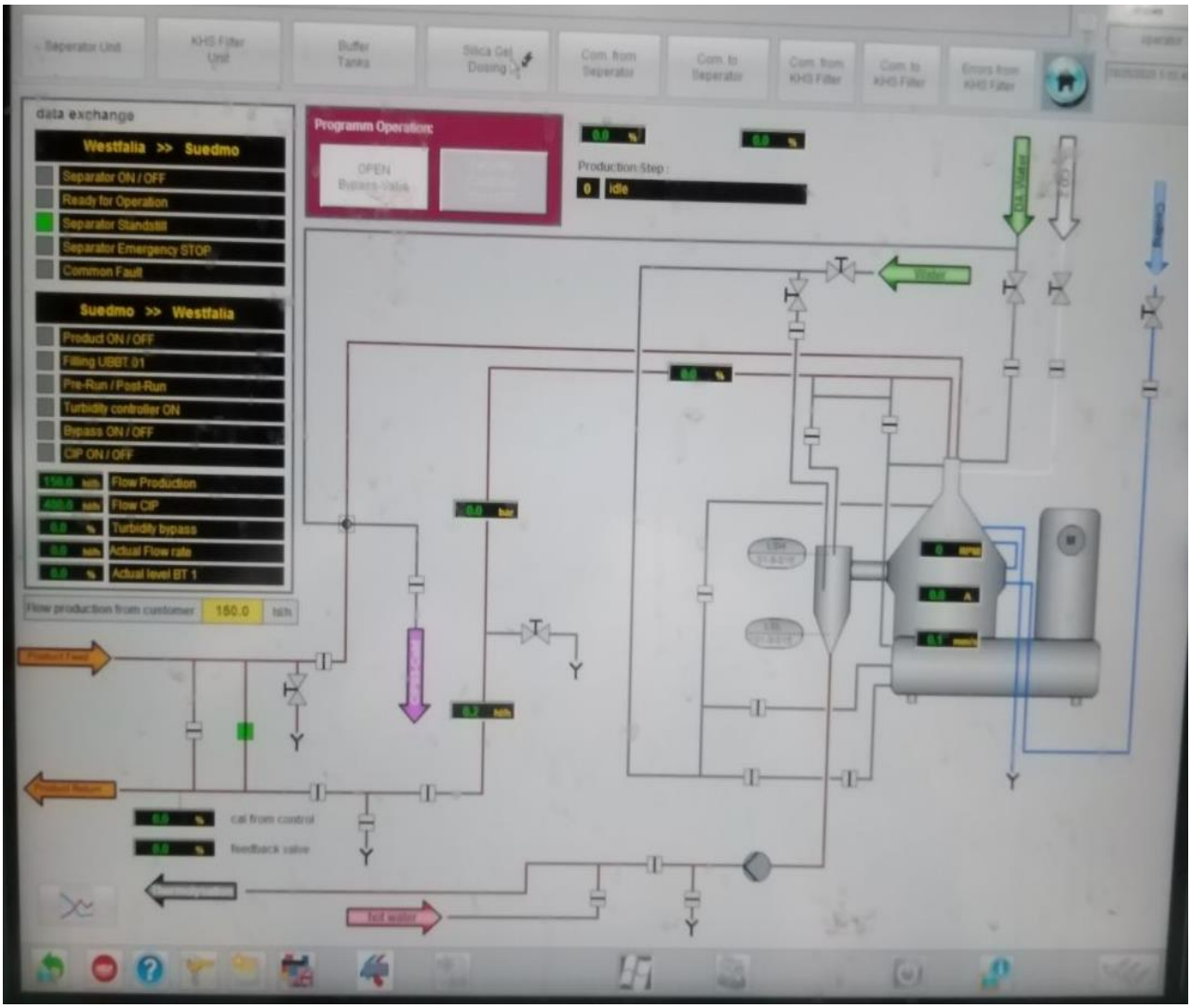

Fig.4.1b: monitoring centrifuige operational condition(PLC)

4.2. Recognizing deviations of variables

Source of variation or deviation arises from the following points

- equipment production outputs :equipment should be wooden ,polyethylene or stainless steel
- equipment operating conditions: operating equipment and processing work shop housekeeping should be net and in a good hygienic condition
- Operating parameters like temperatures and pressures: process

4.3. Equipment adjustments and repairs requirement

Before maintenance is accomplished, where adjustments and repairs are required, the following precautions shall be taken.

- The equipment or machine shall be run to a location where it will cause the least interference and is most accessible.

- All controllers shall be checked to assure that they are in the off position.
- If the equipment is electrically powered, the main or emergency disconnect or switch shall be opened and locked in the open position.
- The facility specific lockout/tag out procedures shall be strictly followed. Effective isolation of the energy source shall be conducted.
- Effective warning signs, guards, and barriers shall be installed where overhead maintenance work creates a hazard or where interference with another crane or another crane's electrical conductors could occur.
- Only trained personnel shall work on energized equipment when adjustments and test are required.
- After maintenance work is completed and before returning to service:
  - ✓ Guards shall be reinstalled.
  - ✓ Safety devices shall be reactivated.
  - ✓ Replaced parts, tools, rags, and debris shall be removed.
  - ✓ Maintenance equipment shall be removed.
  - ✓ All locks and tags shall be cleared and removed.
  - ✓ All hazardous conditions and discrepancies disclosed by inspection or operation shall be corrected before resuming normal operation.
  - ✓ Adjustments or replacements of parts shall be made to assure the correct function of all operating mechanisms, including components such as limit switches, control systems etc.

4.4. Testing equipment's

Testing Keep dated reports of operational tests, rated load tests, and manufacturers' certification, as applicable, as long as the device is available for use. Before initial use, load test and inspect all new, altered, modified, or repaired equipment devices.

- An operational test also should be performed.
- Rated load tests shall be done under the direction of a qualified person.
- A written report furnished by such person confirms the specific equipment operation.
- The load rating should not be more than 80 percent of the maximum load sustained during the test.
- Test loads shall not be more than 110 percent of the rated load unless otherwise recommended be the manufacturer.
- The manufacturer furnishes a written statement, signed and stamped by a registered professional engineer, certifying its structural and operational integrity and that it conforms to the specific requirements.

4.5. Returning equipment to services

After assuring the conditions of equipment, it should be returned to the original operation stage to continue production.

4.6. Ensuring equipment that meets normal operating requirements

While you are going too restarted to operate that equipment, be sure which fulfil the working parameter requirements and get a confirmation from the technicians.

Working parameters to be monitored include but not limited to:-

- equipment performance (e.g. speed, output, variations)
- equipment component performance
- sequences and timing of operation

4.7. Confirm equipment status and condition. This include checking for:

- lubricating or hydraulic fluid leaks
- setting speed of screw
- attaching hoses and/or opening valves
- setting pumps and lines from collection trays into receiving tanks

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

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

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

Information Sheet 5- Identifying, rectifying and reporting out of specification

Introduction

Out of specification product, a product which is deviated from tolerable qualitative and quantitative level. But any product should fulfill at least minimum level of a standard. Out of specification product can also be known as nonconformance product.

5.1. Monitoring the process and equipment operation to identify out-of-specification results or non-compliance. This involve monitoring:

- Infeed flow
- Centrifugal pressure
- product loss
- dilution
- oxidation
- speed of centrifuge (rpm)
- turbidity
- total microbial count
- relevant product characteristics (solids content and press fractions)

5.2. systems for Rectifying and Reporting nonconformance product

Corrective and preventive action (**CAPA**, also called corrective action/preventive action or simply corrective action) consists of improvements to an organization's processes taken to eliminate causes of non conformities or other undesirable situations. It is usually a set of actions that laws or regulations require an organization to take in manufacturing, documentation, procedures, or systems to rectify and eliminate recurring nonperformance. Non-conformance is identified after systematic evaluation and analysis of the root cause of the non-conformance.

5.2.1. Non-conformance

- failure of Machinery
- quality management system
- Misinterpretation of written instructions to carry out a work.

The corrective and preventive action is designed by a team that includes quality assurance personnel and personnel involved in the actual observation point of nonconformance. It must be systematically implemented and observed for its ability to eliminate further recurrence of such non-conformation.

5.2.2. Corrective action and preventive action (CAPA)

It focuses on the systematic investigation of the root causes of identified problems or identified risks in an attempt to prevent their recurrence (for corrective action) or to prevent occurrence (for preventive action).Corrective actions are implemented in response to customer complaints, unacceptable levels of product non-conformance, issues identified during an internal audit, as well as adverse or unstable trends in product and process monitoring such as would be identified by statistical Process Control (SPC).

Preventive actions are implemented in response to the identification of potential sources of non-conformity. To ensure that corrective and preventive actions are effective, the systematic investigation of the root causes of failure is pivotal. CAPA (preventive action and corrective action) is part of the overall Quality Management System (QMS).

Table 5.1: List of typical noticeable nonconformance effect and their corrective actions during wine clarification

Source of non-conformance(NCR)	Effect of non-conformance	Corrective action to take over non conformance
1. Slow infeed flow	• There will oxygen uptake (may be greater than 10ppb) and hence will fever for microbial contamination	• Adjust flow between 180-200hl/hr. • Apply counter pressure • Blanket inert gasses
2. Fast infeed flow	• The wine will be cloudy or turbid	• Adjust flow between 180-200hl/hr.
3. Low revolution of centrifuge	• Inefficient separation of yeast and bacteria and hence increases microbial count on clarified wine	Revolution should be adjusted between 6000-10000rpm
4. Frequent discharging sludge	• Increase production loss	• Set proper sludge discharging frequency (between 15-20 minutes)

1.2. Clearly identified sources of data that identify problems to investigate

Root cause analysis that identifies the cause of a discrepancy or deviation, and suggest corrective actions. A common misconception is that the purpose of a preventive action is to avert the occurrence of

a similar potential problem. This process is all part of corrective action, because it is a process of determining such similarities that should take place in the event of a discrepancy. Preventive action is any proactive methodology used to determine potential discrepancies before they occur and to ensure that they do not happen (thereby including, for example, preventive maintenance, management review or other common forms of risk avoidance).

Corrective and preventive actions both include stages for investigation, action, review, and further action if required. It can be seen that both fit into the PDCA (Plan-Do-Check-Act) philosophy as determined by the "Deming-Shewhart "cycle.

Investigations to root cause may conclude that no corrective or preventive actions are required, and additionally may suggest simple corrections to a problem with no identified systemic root cause. When multiple investigations end in no corrective action, a new problem statement with expanded scope may be generated, and a more thorough investigation to root cause performed.

Implementation of corrective and preventive actions is the path towards improvement and effectiveness of Quality Management Systems. Corrective actions are nothing but the action/actions based on the problem identification.

The problem or a non-conformance can be identified internally through staff suggestions, management reviews, document reviews or internal audits. External leads to finding the root cause of the problem can include:

Customer complaints/suggestions; customer rejections; non-conformities raised in customer/third-party audits; recommendations by auditors.

A root cause is the identification of the source of the problem where the person(s), system, process, or external factor is identified as the cause of the non-conformity. The root cause analysis can be done via 5 times Whys

Corrective action is the re-work/rectification activity of the non-conforming products as per ISO 9001:2008 (8.5.2).

Preventive action includes the prediction of problems and attempts to avoid such occurrences (fail safe) through self-initiated actions and analysis related to the processes/products.

This can be initiated with the help of an active participation by staff members/workers through improvement teams, improvement meetings, opportunities for improvement during internal audits, management review, customer feedback and deciding own goals quantized in terms of business growth, reducing rejections, utilizing the equipment effectively, etc.

1.3. Immediate notification potentially harmful or unacceptable effects

The authorization holder has a legal obligation to report immediately about adverse effects of the active substance or biocidal product, development of resistance, in adequate efficacy or other new data.

In particular, the authorization holder is obligated to report immediately:

- New data or information on adverse effects of the active substance or biocidal product on humans, especially vulnerable groups, as well as on animals or the environment
- All data indicating the development of resistance to the active substance.

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

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

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

LG #33	LO #3- Shutting down the clarification 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-off or recycling waste
- Conducting work within environmental guide line

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 prepare equipment for cleaning
- Collect ,treat and dispose or recycle waste
- Conduct work within environmental guide line

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

1.1. Shutting down the process

Shutting down plant may require single or multiple energy sources to be shut down, that is,

- electrical
- air
- hydraulic
- Chemical sometimes in a certain order.

Ensure the plant operator is aware work is being conducted. On many occasion workers are typically injured when plant operators are unaware the plant is being worked on. After cleaning, all equipment should be rinsed with clean potable water. If the equipment is not to be used immediately it should be allowed to drain dry.

1.2. General lockout/ tag out procedure

1.2.1. Purpose

This procedure establishes the minimum requirements for lockout of energy sources that could cause injury to personnel. All employees shall comply with the procedure.

1.2.2. Responsibility

The responsibility for seeing that this procedure is followed is binding upon all employees. All employees shall be instructed in the safety significance of the lockout procedure by (designated individual). Each new or transferred affected employee shall be instructed by (designated individuals) in the purpose and use of the lockout procedure.

1.2.3. Preparation for Lockout

Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, or others) may be involved. Any questionable identification of sources shall be cleared by the employees with their supervisors. Before lockout commences, job authorization should be obtained.

1.2.4. Sequence of Lockout Procedure

- Notify all affected employees that a lockout is required and the reason therefore.
- If the equipment is operating,
- Shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch).
- Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, and other) is disconnected or isolated from the equipment.
- Lockout energy isolating devices with an assigned individual lock. Stored energy, such as that in capacitors, springs, elevated machine members, rotating fl y wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, and bleeding down.
- After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.
- Return operating controls to neutral position after the test.
- The equipment is now locked out.

1.2.5. Restoring Equipment to Service

When the job is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed. When equipment is clear, remove all locks. The energy isolating devices may be operated to restore energy to equipment

1.2.6. Steps to shut down centrifugation process

1. Push out a product by process water
2. Clean a centrifuge by pressing full discharge button(water)
3. Clean a centrifuge by pressing partial discharge button (water)
4. Repeat both steps until discharging water gets clean
5. press stop button to finish centrifugation 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: Choose the best answer

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

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

Information Sheet 2- Dismantling and preparing equipment for cleaning

Definition

Dismantling: Dis locating equipment components or parts of equipment in each sequential order

Cleaning: Removing and separating off-specification material, organic and non-organic debris, metals, and pesticide residues, among other contaminants, from the raw material prior to further processing

2.1. Reasons for Cleaning to:

Reduce the risks from food hazards -food poisoning and foreign body contamination

- To comply with local and international legislation
- To meet specific customer requirements,

To meet the requirements of global food safety standards

- To maintain positive audit and inspection outcomes
- To allow maximum plant productivity
- To present a hygienic visual image
- To promote safe working conditions for staff, contractors and visitors
- To maintain product shelf-life
- To avoid pest infestation

The main purpose of cleaning is to remove undesirable foreign material and it should be designed to obtain:

- Complete removal of separated contaminants and avoidance of recontamination
- Maximum separation efficiency consistent with minimum wastage of desirable material
- Minimum quantity and concentrations of residues the foreign material found on fruits and vegetables can be grouped under the following headings:

Cleaning Methods

Wine makers should prefer cleaning methods appropriately that could be compatible for the specific equipment's. Cleaning methods include the following categories:

- Automatic cleaning (cleaning in place, CIP)
- Manual cleaning (outdoor cleaning, COP)

Manual cleaning

Using cloths, mops, brushes, pads, etc. It is normally used in small areas, equipment that is non-water proof or requires dismantling or areas which are difficult to clean by other methods. It is a labor intensive method and may limit the use of certain chemicals for safety reasons. To ensure Cleaning is effective the method must be clearly defined and staff trained to an appropriate level.

Cleaning procedures

Cleaning is a complex process. To ensure it is conducted correctly a defined and systematic approach is required that takes into account a number of factors previously covered. This approach takes the form of a Procedure and this is usually a legal requirement in addition to a fundamental requirement of global food standards.

A collection of these cleaning procedures forms a cleaning plan or program which is plant specific.

A typical cleaning activities includes the following:

- Cleaning method: cleaning in place method (CIP)
- Concentration standard :2-2.5.% of caustic solution (NaOH)
- Frequency: once per week
- Chemicals used: caustic solution NaOH
- Time and temperature specifications: for 30 minutes at 80 ^{o}c.

The correct sequence of a general cleaning procedure for surfaces in a food plant is:

1. Gross Clean/Preparation: preparing solutions to required concentration and temperature
2. Pre-rinse: to remove surface debris in contact with on equipment and to avoid solution loss
3. Detergent application: applying detergent at appropriate contact time and pressure
4. Post-rinsing: to remove chemical residue
5. Disinfection: to remove microbial contamination
6. Terminal rinsing: to remove any chemical residue

2.1.1. Steps of dismantling and cleaning of wine centrifuge

1. Untightening a ball

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

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

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

Information Sheet 3- Collecting, treating and disposing-off or recycling waste

3. Collecting, treating and disposing-off or recycling waste

Any wine spillage should be cleaned up immediately using procedures appropriate to the location of the spillage, such as localized bonding and recovery procedures.

Waste in wine clarification includes centrifugal sludge which is collection of suspended solids and dead yeast called cold break or trub. This trub should be collected in a reservoir frequently during clarification and to termolysed. And this termolysed or yeast can be used for either cows feed or as a fertilizer for vineyard but cleaning waste should be collected from each section and treated based on procedure and then can be disposed to the environment without altering or polluting the environment.

Cleaning water could be collected from each unit operation and treated in waste management plant and then can be used as recycled for ground cleaning, for irrigation, etc…

Sludge could be removed from centrifugal equipment as soon as practicable all types of waste (e.g. general refuse, winemaking waste and sewage) should be appropriately disposed of according to local requirements and in compliance with current environment legislation.

Fig. 3.1: sludge collecting in centrifuge

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

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

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

4.1. Rules for Using Lockout Procedure

All equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy isolating device bearing a lock

Winery plant must be maintained and repaired according to the manufacturer's specifications or, in the absence of such specifications, in accordance with a competent person's recommendations.

Plant should be isolated before maintenance or cleaning commences. Where plant is isolated and plant shutdown will result, any total or partial shutdown should not allow a hazardous situation to be created. Isolated or disengaged plant should: not hinder or interfere with the operation of any other plant have guards in place where a risk of injury is identified, and not obstruct access.

A process should be put in place to enable effective communication and consultation with affected workers and other persons conducting a business or undertaking to prevent any risk to health and safety arising from restarting the operation of the plant which has been shut down due to inspection, maintenance or cleaning.

An energy isolation procedure should be developed to ensure that potential energy sources, that is, electrically charged capacitors, hydraulic and pneumatic pressure and water pressure are in a zero mechanical state prior to any maintenance or cleaning work being carried on plant items such on grape presses.

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

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

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

LG #29	LO #4- Recording information

Instruction sheet

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

- Recording work place information
- Signing in all records
- Communicating information records
- Keeping work place information records

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 work place information
- Sign in all records
- Communicate information records
- Keep work place information records

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 work place information

1. Recording work place information

Processing records must be kept so that all batches of product can be readily identified, tracked and traced, and that the amounts of any raw materials used are clearly identified and recorded to comply with all relevant legislation. These records must satisfy the requirements of the Wine Australia's Label Integrity Program and Food Standards Australia New Zealand. A system for checking added quantities of additives and processing aids and final wine concentrations of these, which are limited by legal requirement, must be employed Employers are required to keep health and safety records and statistics on file. Examples of documentation include training activities, first aid treatments, and incident investigations. Written records and statistics can help:

- Identify trends for unsafe conditions or work practices so you can take steps to correct these potential hazards Provide material for education and training
- Provide documentation in case a Work Safe officer requests it, or
- if an incident occurs and you need to prove that you did all you could reasonably do to prevent it

1.1. work place information May include:

- Standard Operating Procedures (SOPs):
- Specifications
- production schedules or instructions
- routine maintenance schedules
- work notes
- manufacturer instructions
- verbal direction from manager, supervisor or senior operator Print or screen based

1.1.1. Specification

Lists of detailed requirements with which the products or materials used or purchased for the winemaking process have to conform. They serve as a basis for quality evaluation

1.1.2. Standard Operating Procedure (SOP)

An authorized written procedure giving instructions for performing operations not necessarily specific to a given product or material (winemaking processes – handling, blending, filtering, stabilization, equipment operation, maintenance and cleaning; validation; cleaning of premises, environmental control; sampling and inspection). Certain SOPs may be used to supplement product-specific master and batch

production process documentation. Standard Operating Procedures (SOPs) should be thoroughly documented for cleaning procedures and should be strictly adhered to at all times, the equipment checked after cleaning and before reuse

1.1.3. Validation

Action of proving, in accordance with the principles of GMP, that any procedure, process, equipment, material, activity or system actually leads to the expected results.

tttyjyghjgj

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: Choose the best answer

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

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

Information Sheet 2- Signing in all records

2. Signing in all records:

which is put a signature on a respective records to take a responsibility of activities what he/she has do and inspect on his work place .Record your inspection and actions, sign out and pass the tool to the worker or store it safely.records that needs a signature in the work place includes:

- Daily work instruction : manager or supervisor who wright the instruction should put her or his sign including name
- Maintenance report :operator or technician who did maintenance activity should report maintenance recording format and should put a signature
- Daily operational activity reporting check list : an operator should put his or her signature like on
  - ✓ Pressure control records
  - ✓ Pump speed control
  - ✓ Product analysis record
  - ✓ Daily none conformance report
  - ✓ Production volume record
- Cleaning activity records
- First aid treatment
- Incident inspection
- Food safety follow up record

Here below is an example for records to be signed by responsible personnel.

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

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

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

Information Sheet 3- Communicating information records

3. Communicating information records

Any instance of contamination should be reported to a designated responsible person, such as the winemaker, immediately the contamination occurs or is detected and the wine quarantined or isolated for further action. The contamination should be clearly identified and recorded.

3.1. Reporting incidents and injuries to Work Safe

Employers must report any of the following incidents (to initiate a claim) to Work Safe within a limited period of time

- A worker is injured and loses consciousness.
- A worker is sent for medical treatment by a first aid attendant or supervisor.
- A worker has an injury or disease that needs medical treatment.
- A worker states that he or she is going to get medical treatment or has already received medical treatment for an injury or disease.
- A worker is (or claims to be) unable to do his or her job because of any injury or disease.
- An artificial limb, eyeglasses, dentures, or hearing aid is broken in the incident

3.2. Role of communicating records

Good communication among employers, supervisors, and workers on health and safety issues is vital for the success of a workplace health and safety program. Hold regular monthly meetings with workers to discuss health and safety matters. Focus your meetings on identifying and correcting hazardous conditions or tasks, and making health and safety a priority in your workplace. Keep a record of each meeting including:

- What was discussed and who attended.
- Post meeting minutes for everyone to read Bring to each meeting:
- Your latest inspection report any incident reports completed during the past month
- Any new safe work procedures
- The minutes for last month's meeting

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

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

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

Information Sheet 4- Keeping work place information records

4. Keeping work place information records

Keeping records means that documenting any relevant records either in hard copy or soft copy and to be accessed easily by concerned personnel.

Maintain records and statistics for the following:

- Health and safety program reviews: can help you track the progress of your program.
- Worker orientation records: can help ensure that workers are getting the education and training they need.
- Inspection reports: can provide historical information about hazards your business has encountered and how you have dealt with them.
- Monthly meeting records: can help monitor how promptly and how well “action items” have been carried out.
- Incident investigation reports: can clarify which hazards have caused incidents and how they were controlled.
- First aid records: can provide injury statistics that will help prioritize health and safety efforts.
- Statistics that may be of value include the following:
  - ✓ Number of incidents and injuries each year
  - ✓ Number of workdays lost each year.
  - ✓ Cost to your business from workplace injuries each year

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

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

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

Reference Materials

Book:

WEB ADDRESSES

The trainers who developed the learning guide

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