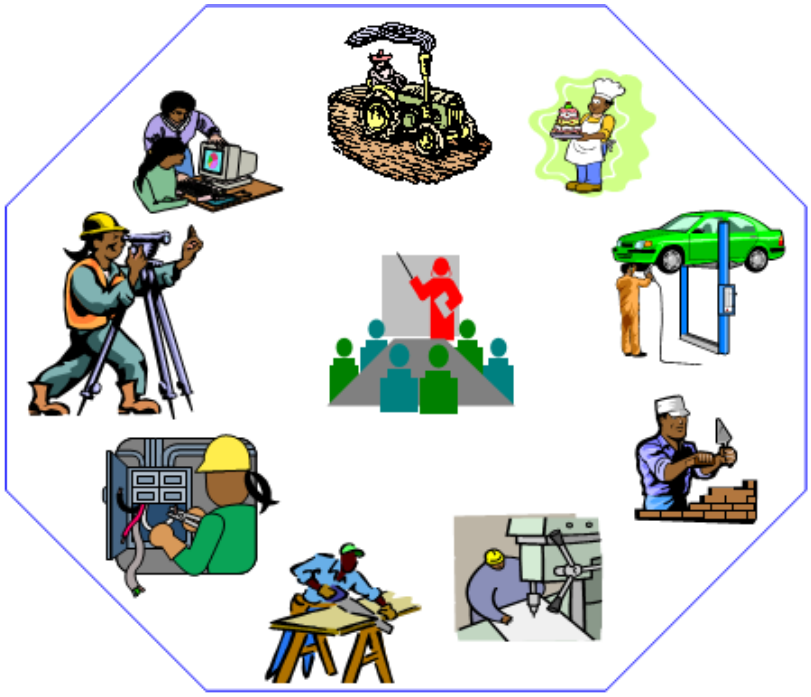
Dairy Product Processing Level III

Based on May 2019, Version 2 OS and March. 2021, V1 Curriculum



Module Title: Applying Process Knowledge to Solve Production Problem

LG Code: IND DPP3 M07 LO (1-2) LG (23-24)

TTLM Code: IND DPP3 TTLM 0321 v1

March 2021

Bishoftu, Ethiopia

With the support of
UNESCO
United Nations Educational, Scientific and Cultural Organization
Republic of Korea Funds-in Trust

Table of Contents page

LO #1 Monitor milk supply and quality 1
Information Sheet 1 Identifying and reporting non-conformance in ingredients 2
Self-Check 1 6
Information Sheet 2. Investigating and reporting causes of non-conformance 7
Self-Check 2 11
Information Sheet 3. Determining and implementing corrective action 12
Self-Check 3 14
Information Sheet 4. Taking action to prevent recurrence of non-conformance 15
Self-Check 4 18
Information Sheet 5. Reporting action. 19
Self-Check 5 22
LO #2 Prepare cheese making equipment and add ingredients 23
Information Sheet 1 Monitoring processing parameters, stages and changes 24
Self-check 1 29
Information Sheet 2 Identifying and taking corrective action non-conformance in processing, handling and storage 30
Self-check-2 33
Information Sheet 3.Investigating and reporting causes of non-conformance 34
Self-Check- 3 38
Information Sheet4. Determining and implementing corrective action 39
Self-Check-4 42
Information Sheet 5.Taking action recurrence of non-conformance 43
Self-Check. 5 46
Information Sheet 6. Reporting action 47
Self-Check 6 51
Information Sheet 7.Conducting work with environmental work place guideline 52
Self-Check.7 56
Reference 58
Answer Sheet 59

L #23	LO #1 Monitor milk supply and quality

Instruction sheet

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

- Identifying and reporting non-conformance in raw materials/ingredients
- Investigating and reporting causes of non-conformance.
- Determining and implementing corrective action
- Taking action to prevent recurrence of non-conformance
- Reporting action.

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

- Identify and report non-conformance in raw materials/ingredients
- Investigate and report causes of non-conformance.
- Determine and implement corrective action
- Take action to prevent recurrence of non-conformance
- Report action.

Learning Instructions:

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

Information Sheet 1 Identifying and reporting non-conformance in ingredients

1.1. Introduction

Non-conformance relates to a failure to comply with requirements or nonconformity (sometimes referred to as a defect) is a deviation from a specification, a standard, or an expectation. Nonconformities classified in seriousness multiple ways, though a typical classification scheme may have three to four levels, including

- Minor Non-conformance
- Major Non-conformance
- Critical Non-conformance

A. Minor Non-conformance:

Low risk situation. 'A non-conformance with the approved food safety arrangement where the potential impact of the non-conformance is not likely to compromise food safety.' A minor non-conformance must corrected prior to the next scheduled audit.

B. Major Non-conformance:

Medium risk situation. 'A non-conformance with the approved food safety arrangement where the potential impact of the non-conformance is likely to compromise food safety and suitability if no remedial action is taken to correct the non-conformance within a specified period.' A major non-conformance must corrected within 30 days and is subject to follow-up audit.

C. Critical Non-conformance

High-risk situation. 'A high risk non-conformance with the approved food safety arrangement where the potential impact of the non-conformance is of substantial and/or immediate significance to food safety and suitability warranting immediate corrective action.'

The need for Dairy safe to initiate compliance action may arise from reports of non-compliance with standards, the production of unsafe or unsuitable food, and foodborne illness investigations.

Dairy product safe will follow up the correction of major Corrective Action Requests (CARs) at or after the standard 30-day timeframe provided to correct the non-compliance

1.2 Sources of contamination

1) On the Farm •

Milk contains relatively few bacteria when it leaves the udder of the healthy cow and generally these bacteria do not grow in milk.

During milking, the contamination of milk is by the exterior of the udder and adjacent areas. Bacteria found in the manure, soil and water might enter from this source.

Two most significant sources of contamination are dairy utensils and milk-contact surface, including the milk pail or milking machines.

Undesirable bacteria from these sources include

- Lactic streptococci
- Coliform bacteria
- Psychro-trophic
- Gram-negative rods
- Thermoduric, those that survive pasteurization, e.g.,
  - ✓ Micrococci
  - ✓ Enterococci
  - ✓ Bacilli,
  - ✓ Brevis bacteria.

Other possible sources of contamination are the hands and arms of the milker or dairy workers, the air of the barn or milking parlor, and flies. • The number of bacteria per milliliter of milk added from various sources depends on the care taken to avoid contamination.

2) Transportation

In Transit and at manufacturing level after milk is left in the farm, the possible contamination include

- The tanker truck
- Transfer pipes
- Sampling utensils
- The equipment at the market-milk plant or other processing plant like

  - ✓ Pipelines
  - ✓ vats, tanks pumps, valves, separators are the possible sources of bacteria.
  - ✓ The amount or level of contamination from each of these sources depends on cleaning and sanitizing methods. • Hands and arms of the employees are a possible source of contamination and pathogens

1. 3. Non-conformity of milk and milk products

There are different reasons for the non-conformity in milk and other ingredients. Some of them are

1.3.1 Off-flavors-

Commonly found in milk classified into three basic categories the ABC's of off-flavor development**.**

- A=Absorbed - feedy, barny, cowy, unclean, weedy, and musty.
- B=Bacterial - acid, malty, unclean, fruity, and putrid.
- C=Chemical - cowy (ketosis), rancid, oxidized, sunlight, and medicinal.

A) Flavor changes •-Sour or acid flavor, Aromatic and bitter flavors are an indication of non-conformance products because of aged milk or adulterated.

B) Physical change

Color changes • Blue milk is one of an indication of non-conformity.

C) Spoilage- Spoilage of milk usually is caused by psychrotrophs that recontamination the milk after pasteurization

D) Temperature – high temperature range can cause non-conformity in milk products. The temperate range should be 300 $\pm$ **10^0F**

1.3.2 Contamination milk equipment (storage containers and transportation systems)

Improperly cleaned milking equipment and cooling equipment's are one of the main sources of milk contamination.

Milk residues left on the equipment contact surfaces supports the growth of a variety of microbes. Although natural inhabitants of the teat canal, apex and skin. microorganisms associated with contagious mastitis do not grow well on these equipment's, it is possible that certain strains associated with environmental mastitis grow to a significant level. Since, it is very difficult to remove all milk residues and deposits from the milk contacting the surfaces of milk equipment.

Milk tanker and collecting pipes are also the potential sources of contamination, if not adequately cleaned. In addition, biofilms can easily build up on the enclosed, hard to clean surfaces

Unclean or improperly cleaned milk cans and lids if they are still moist, results in multiplication of thermophilic bacteria like *Bacillus cereus.* Improperly sterilized milking machines contain thermoduric micrococci, *Bacillus* spp. and *Microbacterium* spp. predominantly compared to coliforms and streptococci. Rubber hoses predominantly contribute to pseudomonads rather than thermodurics.

Self-Check 1	Written Test

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

Fill the black space

1. Write the classification scheme of non-conformities of ingredient! (4%)

_____

_____

_____

_____

2. Write the sources of raw milk contamination! (2%)

_____

_____

3. Write the causes of non-conformance in milk and milk products (3%)

_____

_____

4. Write the mechanical causes of non-conformances (3%)

_____

_____

Answer the following question!

Note: Satisfactory rating 7 and 12 points Unsatisfactory below 7 and 12 points

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

Answer Sheet

Score = _____

Name: _____ Date:

Information Sheet 2. Investigating and reporting causes of non-conformance

2.1 The types of contamination/ deterioration of raw materials in Non-conformance

- Mechanical causes:
- Physio- biochemical causes:
- Microbial causes:
- Physical causes:

2.2. Evaluation of non-conformance product

The evaluation of non-conformance shall include a determination of the need for an investigation and notification of the persons or organizations responsible for non-conformance.

The evaluation and any investigation documented. Investigation are not always required when an investigation has already performed on similar issue

Documentation as an industry practice like:

- Form that identifies the
  - ✓ Material
  - ✓ The problem
  - ✓ Evaluation
  - ✓ Segregation
  - ✓ The investigation (if any)
  - ✓ disposition and signatures
- Standard operating procedure (SOP)
- Work instruction (WI)

2.2.1. Microbial milk contamination

Moreover, these facts implicated in **milk** quality, **milk** spoilage and unsafe **dairy** products

A. **Spoilage of Milk and cream**

Milk is an excellent culture medium for many kinds of microorganisms, being high in moisture, nearly neutral pH, and rich in microbial foods.

The genera found in cold-stored milk include

- Pseudomonas,
- Acinetobacter
- Aerobacter Alcaligens
- Flavobacterium as well as some members of Entero bacteriaceae. With extended storage of milk products at refrigerated temperatures, psychrophilic or psychrotrophic organisms are a cause of spoilage.

Spoilage of milk usually caused by psychro trophy that recontamination the milk after pasteurization. Also involved are thermoduric psychrotrophs as well as heat- stable proteases produced before pasteurization.

A. Gas Production

Gas formation with acid formation • Chief gas former are coliform bacteria, Clostridium spp., gas forming Bacillus species that yield both hydrogen and carbondioxide, yeats and heterofermentative lactics that produce only carbon dioxide.

Gas production evidenced by foam at the top of milk and is supersaturated with the gas, by gas bubbles caught in curd, by floating curd containing gas bubbles, or by a ripping apart of the curd by rapid gas production, causing the so-called stormy fermentation of milk are:

- Coliform bacteria are responsible for most gas formation.
- Hetero fermentative lactic also may produce gas, but usually not enough to be evident
- Yeasts usually are absent or in low numbers in milk and donot compete well with the bacteria
- Bacillus and clostridium do not compete well with acid former at higher temperature but may function if the acid former are absent
- Thus in pasteurizing temperature or above, the spores of Clostridium and Bacillus species will survive, and gas formation by the spore formers may take place.

B. Proteolysis

The hydrolysis of milk proteins by microorganism usually accompanied by the production of bitter flavor caused by some of the peptides released.

Proteolysis favored by storage at low temperature, by destruction of lactic and other acid formers by heat, and by the destruction of formed acid in the milk by molds and film yeasts or the neutralization of acids by products of microorganisms.

Actively proteolytic bacteria are found among species of micrococcus, Alcaligens, Pesudomonas, Proteus, Flavobacterium, and Serratia, all of which are genera of non-spore- forming bacteria and of genera Bacillus and Clostridium of the sporeformers.

Some species of the genera Micrococcus, Pseudomonas, Proteus, Flavobacterium, Alcaligens and Bacillus can grow at low temperatures and hence likely to cause some proteolysis and/ or bitterness of milk held at chilling temperature.

C. Repines

Repines and sliminess can occur in milk, cream. Bacterial repines causes by

- Slimy capsular material from cells and ordinarily develops low temperature.
- The repines usually decreases as the acidity of the milk or cream increases
- Two main types of ropiness: Surface ropiness and Ropiness throughout milk

Surface repines caused often by Alcaligens viscoelastic, an organism chiefly from water or soil that can grow fairly well in vicinity of 10 C. Micrococcus freudenreichi can also cause repines.

Repines throughout is caused often by Entero-bacter aerogens, Klebsiella oxytoca and rarely Escherichia coli

Sources of the bacteria causing repines are water, manure, utensils, and feed, the reduction or elimination of contamination from these sources helps prevent ropiness.

C. Changes in Milk fat

Milk fat decomposed by various bacteria, yeasts and molds like:

A) Oxidation of the unsaturated fatty acids. - yields aldehydes, ketones and acids and results in tallow odors and tastes.

B) Hydrolysis of the butterfat to fatty acids and glycerol by the enzyme lipase.

C) Combined oxidation and hydrolysis to produce rancidity.

Species of lipase forming bacteria are found in many of the bacterial genera e.g., Pseudomonas, Proteus, Alcaligens, Bacillus, Micrococcus, Clostridium and many others. • Pseudomonas frag and Staphylococcus aureus produce heat-resistant lipases, which may survive pasteurization if present in the raw milk.

D. Alkali production • Pseudomonas fluorescens and Alcaligenes viscolactis. • Production of ammonia from organic acids and urea results in alkali formation.

1. Flavor changes • Sour or acid flavor: Clean: produced by Streptococcus lactis and other lactics. Aromatic: By Streptococci and aroma forming Leuconostoc species Sharp: by coliform bacteria, Clostridium spp., Clean and aromatic flavours are desired in fermented milk products, but sharp flavours are undesirable.
2. Bitter flavors : Results from proteolysis, lipolysis or even fermentation of lactose. Organisms: Coliform bacteria, yeasts, actinomycetes • Burnt flavour: Streptococcus lactis var. maltigens produce this flavour.
3. Color changes • Blue milk: Pseudomonas syncyanea when grow with Streptococcus lactis • Yellow milk: Pseudomonas synxantha and species of Flavobacterium. • Red milk: Serratia marcescens, Micrococcus roseus • Brown milk: Pseudomonas putrefaciens

Self-Check 2	Written Test

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

Fill the black space

1. Write the **types contamination**/ deterioration of raw materials in Non-conformance (4%)

_____,_____

_____,_____:

2. Write the investigation of document in industry! (4%)

_____,_____

_____,_____

_____,_____

3. Mention the causes of milk and cream spoilage (4%)

_____,_____

_____,_____

_____,_____

Answer the following question!

Note: Satisfactory rating 7 and 12 points Unsatisfactory below 7 and 12 points

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

Answer Sheet

Score = _____

Name: _____

Information Sheet 3. Determining and implementing corrective action

3.1 Presentation

Removal of microorganism •

- Use of heat
- Use of low temperature
- Drying
- Use of preservatives
- Using quality and clean water for animal and to clean milk equipment.

A. Heat treat at right standard

Different ways of heat treatment used to protect milk spoilage and achieved long shelf life of raw milk and milk product.

The achieved shelf life of processed **milk** depends on both the time and temperature of heat **treatment**. There are three principal categories of heating **methods**:

- Pasteurization
- extended shelf life (ESL) **treatment**
- ultra-high temperature (UHT) **treatment**.

To kill harmful bacteria, **milk** heated through a process called pasteurization. Pasteurization uses a combination of time and temperature to make **milk** safer. The higher the temperature, the shorter the amount of time the **milk** needs

Milk usually pasteurized by heating at:

1. Typically at 63°C for 30 minutes (batch method) or
2. At 71°C for 15 seconds (flash method) to **kill bacteria** and extend the **milk's** usable life. The process **kills** pathogens but leaves relatively benign **microorganisms** that can sour improperly stored **milk**.

What you do not want done to yourself, do not do to others."

Conversely, suppliers who are not responsive in resolving problems with non-conforming

products often wake up and take notice when they charged in full for the reasonably costed impact of their non-conforming product.

To find out how to transform supplier quality monitoring and deliver step change improvement in product safety and quality give us a call.

- Improving through manage during production, processing and distribution.
- Properly handling milk equipment
- For milk collection, using Equipment with smooth surfaces and minimal joints
- Cooling milk at 4^0C

Self-Check 3	Written Test

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

Fill the black space

1. Write the mechanism of presentation of non-conformance of microorganism (5%)

_____

_____

_____

_____

2. Write the types of Heat treatment standard in cheese making!

_____

_____

_____

Answer the following question!

Note: Satisfactory rating 6 and 10 points Unsatisfactory below 6 and 10 points

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

Answer Sheet

Score = _____

Name: _____

Information Sheet 4. Taking action to prevent recurrence of non-conformance

Careful inspecting and checking the quality of raw milk collected.

The collected raw milk should be:

- Free of debris and sediment
- Free of off-flavors
- Free of abnormal color and odor
- low in bacterial count
- Free of chemicals (e.g. antibiotics, detergents)
- Normal composition and acidity

Quality control achieved by

Inspection of raw materials to ensure that poor quality ingredients are used.

- Carrying out checks on the process to ensure that the weights of the ingredients and temperature and time of processing are correct.
- Inspecting the final product to ensure that poor quality products not distributed to consumer.

4.1 Corrective and preventive action

Corrective and preventive action consists of improvements to eliminate causes of non-conformities or other undesirable situations.

4.1.1 Corrective Action

Corrective action: Action taken to eliminate the causes of non-conformities or other undesirable situations, to prevent recurrence

Corrective actions 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 identified by statistical process control (SPC).

At farm level

- Before milking proper cleaning and disinfecting milking equipment and keeping the milker hygienic and health
- During milking proper cleaning the udder and teat of dairy cows
- Only milking health dairy cows
- Transporting milk by appropriate equipment
- Cooling milk at standard cooling temperature below 4^0C and

4.1.2 Preventive action

Preventive action: Action taken to prevent the occurrence of such non-conformities, generally because of a risk analysis. To ensure that corrective and preventive actions are effective, the systematic investigation of the root causes of failure is pivotal. Preventive actions implemented in response to the identification of potential sources of non-conformity

Applying appropriate milk production practice like

- Producing milk from health dairy animal
- Collecting only quality milk and processing rapidly
- Even if milk stored at standard milk cooling temperature (below 4^0C) regular check the milk before processing in case of cold resistance bacteria can exist in the milk.

4.3. Correctly Packaging and labeling

The following are among the more important general requirements and functions of milk product/ food packaging materials/ containers:

- they must be non-toxic and compatible with the specific foods(food graded)
- Sanitary protection
- moisture and fat protection
- Gas and odor protection
- Light protection
- Resistance to impact
- Transparency
- Tamper proneness
- Ease of opening

- Pouring features
- Reseal features
- Ease of disposal
- Size, shape, weight limitations
- Appearance, printability

Self-Check 4	Written Test

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

Fill the black space

1. Write prevent method for recurrence non-conformance milk! (4%)

_____,_____

_____,_____

_____,_____

2. Write the Quality control achieving action in the raw milk! (4%)

_____,_____

_____,_____

3. What are the correct packaging procedures! (4%)

-_____,_____

_____,_____

_____,_____

_____,_____

Answer the following question!

Note: Satisfactory rating 7 and 12 points Unsatisfactory below 7 and 12 points

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

Answer Sheet

Score = _____

Name: _____

Information Sheet 5. Reporting action.

Report is a message presented before the management after making detailed inquiry or investigation with or without opinions or recommendations. In other words, report conveys the information, which used to find the fact or to assist in decision making or solving any business problems. Additional specific form of writing that is organized around concisely identifying and examining issues, events, or findings that have happened in a physical sense, such as events that have occurred within an organization or findings from a research investigation

Top five Tips Non-Conformance's and Corrective Action

With every good quality assurance system or any production or food processing management system (environment, safety, security etc) there will be some non-conformance reports (NCR) or corrective action reports (CAR). They are a great tool for highlighting and managing things that are not working or could work better within the business management systems. In this, top five tips for managing the NCR and Corrective Action process.

1) Scope

Be clear on your required outcome for the Corrective Action. A frequent mistake is trying to fix all issues within one Corrective Action Report CAR. If the problem identified requires a full project to address, then perhaps it better managed as an Objective Keep the focus on CARs to specific actions.

2) Responsibility

Where possible, clearly identify the person responsible for taking the corrective action proposed in the report. Where there is uncertainty or contention around who that should be, escalate and assign to a more senior person. Where appropriate, the CAR might reviewed and discussed at Management Review to determine the correct person to take responsibility, if not necessarily the person to take the action itself.

3) Timescales

Set reasonable timelines for completion; in phases if that is appropriate. If there is a necessarily short deadline, make it clear in the report the reasons for this.

4) Chase

Although everybody should be engaged in the CAR Process, there are going to be times that such activities not given suitable priority. Be proactive in following up on actions and offer help where appropriate, however, if there is a persistent culprit, consider raising it as a disciplinary issue. CARs represent a business risk and should take seriously.

5) Evidence

Before close a CAR confident, that demonstrate that the issue addressed. Before signing off, gather any appropriate evidence that you can file. In some cases, it may be appropriate to re-audit to verify that issues have been properly considered and mitigated. Do not be afraid to refuse to close a report until assured of the correct outcome.

The five tips for writing a **non-conformance report**

- Identify clearly
- What the problem was
- is this called the 'Problem Statement'. Include:
  - ✓ Who
  - ✓ What
  - ✓ Why
  - ✓ When
- Raise the **non-conformance** against the system, and not a person and include the location and evidence needed
- Investigate the problem by asking 'why?

Start by talking with the customer, the one that issued the **NCR**. If they agree with your assessment, then **answer** the **NCR** with the explanation that upon investigation determined the problem lies with the packager that the customer contracted with

NCR#	Client		File No
Function/Area/process			Site
Std.and clause No(s)			
Section1. Details of non-conformity			
Description			
……..			
Auditor		Auditee representative acknowledgement	Category
Date			
Section2.Auditee proposed Action Plan (Attach separate sheet if required)			
Root Couse analysis (How/why did this happen.)			
……..			
Correction (fix now) With completion dates:			
……..			
Corrective action (to prevent recurrence) with completion dates:			
……..			
“ Auditor “review and acceptance of corrective action plan			
Auditee representative			Date
Section 3:Details of “Auditor” Verification of Auditee implementation of action plan			
……..			
Section 4 NCR closed out by “Auditor” on (Date):_		“Auditor” Team leader name:___	

Self-Check 5	Written Test

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

Fill the black space

Answer Sheet

Score = _____

Name: _____

1. Write the top five tips of non-conformance and corrective action!(5%)

_____

_____

_____

_____

_____

Answer the following question!

Note: Satisfactory rating 3 and 5 points Unsatisfactory below 3 and 5 points

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

Answer Sheet

Score = _____

Name: _____

LG #24	LO #2 Prepare cheese making equipment and add ingredients

Instruction sheet

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

- Monitoring typical processing parameters, stages and changes
- Identifying and taking corrective action of non-conformance in processing, handling and storage
- Investigating and reporting causes of non-conformance
- Determining and implementing corrective action
- Taking action recurrence of non-conformance
- Reporting action
- Conducting Wo

Conducting Work-Conducting Work. 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:

- Monitor typical processing parameters, stages and changes in typical reaction
- Identify and take corrective action of non-conformance in processing, handling and storage
- Investigate and report causes of non-conformance in processing, handling and storage
- Determine and implement corrective action
- Take action recurrence of non-conformance
- Report action
- Conduct Work

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 Monitoring processing parameters, stages and changes

1.1 Introduction

Monitoring typical processing parameters, stages and changes due to typical reaction helps to process hygienic products, desirable flavor and quality milk and milk products able to delivered final products for market.

1.1.1 Typical processing changes due to typical reaction

1.1.1 Monitoring stage and changes in pasteurized milk processing

Pasteurization is a relatively mild heat treatment that causes minor changes to the nutritional and sensory characteristics of most foods. However, the shelf-life of pasteurized foods is usually only extended by a few days or weeks compared with many months with the more severe sterilisation heat treatment.

Pasteurized milk is whiter than raw milk but the difference is due to homogenisation, and pasteurization alone has no measurable effect. Loss of volatile aroma compounds during pasteurization causes a reduction in quality and may 'cooked' flavours.

Changes to nutritional quality of pasteurized products are limited to losses of heat-labile vitamins. For example, in milk there is 7% loss of thiamin, 20–25% loss of vitamin C, losses of 0–10% folate, vitamin B12 and riboflavin, and 5% loss of serum proteins.

The pasteurization time for destroying ***E. coli*** and *Staphylococcus aureus* pathogens is around 30 seconds, whereas the pasteurization time required for destroying *Bacillus cereus* is around 90 seconds.

1.1.1 Monitoring stage and changes in yogurt production

Yogurt commercially produced through fermentation by lactic acid bacteria (commonly ***Lactobacillus*** spp. and ***Streptococcus*** spp.) at temperatures usually in the range of 27 to 40°C. In typical processes of elaborating yogurt, the yogurt is not agitated during the fermentation stage. The most traditional process for yogurt elaboration involves milk fermentation by lactic acid bacteria in the same containers in which the product will distributed. The use of non-agitated small vessels is also possible. For liquid formulations or formulations mixed with fruit, mixing applied after fermentation.

Stirring might result in benefits to the processing of yogurt, particularly by improving the mass and heat transport conditions. During fermentation, a critical variable that influences kinetic progress is temperature. By improving heat-transfer and mass-transfer conditions, stirring could reduce temperature heterogeneity and destroy concentration gradients during fermentation, providing a more homogeneous microenvironment for bacterial growth.

In general, 3 main arguments have been stated to justify why agitation should not be used during fermentation of industrial yogurt manufacture:

- Agitation might interfere with the gel-formation process, a key quality attribute in firm yogurt.
- Agitation during fermentation would inhibit the lactic acid formation involved in the process, consequently extending the fermentation time and possibly altering the quality;
- Agitation could favor the incorporation of air into the system, interfering with the fermentation dynamics, an anaerobic event.

1.1.2 Monitoring stage and changes in cheese production

Milk is not a system in equilibrium. It changes even while in the udder. This is partly because different components formed at various sites in the mammary secretory cell and come into contact with one another after their formation. Furthermore, several changes can occur due to the milking, the subsequent lowering of the temperature.

1.2 Classification of changes

1.1.3 Physical changes

Occurring, for instance, when air incorporated during milking: Because of this, additional dissolution of oxygen and nitrogen occurs in milk. Moreover, a new structural element formed air bubbles. Milk contains many surface-active substances, predominantly proteins, which attached to the air–water interface formed. Furthermore, by contact with the air bubbles, fat globules may damage, i.e., lose part of their membrane. Fat globules may cream. Creaming is most rapid at low temperature because the globules aggregate to large flocs during the so-called cold agglutination. On cooling, part of the milk fat starts to crystallize, the more so at a lower temperature. However, even at 0°C part of

the fat remains liquid. The presence of fat crystals can strongly diminish the stability of fat globules against clumping.

1.1.1 Chemical changes

Chemical change cause by the presence of oxygen: Several substances oxidized. In particular, light may induce reactions, often leading to off-flavors. Composition of salts can vary, for example, with temperature.

1.1.2 Biochemical changes

Biochemical changes can occur because milk contains active enzymes: Examples are lipase, which causes lipolysis; proteinases, which cause Main Characteristics proteolysis; and phosphatases, which cause hydrolysis of phosphoric acid esters.

1.2.4 Microbial changes

Microbial changes often the most conspicuous: The best-known effect is production of lactic acid from lactose, causing an obvious decrease in pH. Numerous other changes, such as lipolysis and proteolysis, may result from microbial growth. Cooling of the milk to about 4°C is generally applied to inhibit many of the changes mentioned, especially growth of microorganisms and enzyme action. In many regions, the milk already cooled at the farm, directly after milking, in a so-called bulk tank. The milk should kept cold during transport to the dairy and subsequent storage.

1.3 Stage of processing

At the dairy milk is always processed. Of course, this causes changes in composition and properties of the milk, as it intended to do. These changes can be drastic, as the following examples will show, and it can be questioned whether the resulting product can still be called milk; however, it is standard practice to do so.

The most common processes applied in products processing

1.1.3 Heat treatment

Heat treatment virtually always applied, primarily to kill harmful bacteria. It also causes numerous chemical and other changes.

- **Low pasteurization** (e.g.,15sec at 74°C) is a fairly mild treatment that kills most microorganisms and inactivates some enzymes but does not cause too many other changes.

- **High pasteurization** (e.g., 15sec at 90°C, but varying widely) is more intense; all vegetative microorganisms are killed, most enzymes are inactivated, and part of the serum proteins become insoluble.
- **Sterilization** (e.g., 20 min at 118°C) is meant to kill all microorganisms, including spores; all enzymes are inactivated; numerous chemical changes, such as browning reactions, occur; and formic acid is formed.
- **UHT** (ultrahigh-temperature) heating (e.g., at 145°C for a few seconds) is meant to sterilize milk while minimizing chemical changes; even some enzymes are not inactivated fully.

1.1.4 Separation

Separation, usually by means of a flow-through centrifuge called a cream separator, yields skim milk and cream. The skim milk has a very low fat content, 0.05 to 0.08%. Milk skimmed after gravity creaming has a much higher fat content.

1.1.5 Homogenization

Homogenization of milk leads to a considerable reduction in fat globule size. Such milk creams very slowly but is also altered in other respects. All types of sterilized milk or, more generally, all long-life liquid milk products are homogenized in practice.

1.4.3. Evaporation

Evaporation removes water, producing milk that is more concentrated. Many properties are altered; the pH decreases.

1.4.4. Membrane processes

Membrane processes may be applied to remove water; this is called reverse osmosis. Ultrafiltration separates milk into a concentrate and a permeate that is rather similar to milk serum. Electrodialysis removes some inorganic salts.

1.4.5. Fermentation or culturing:-

Fermentation of milk, usually by lactic acid bacteria, causes considerable alteration. Part of the lactose is converted to lactic acid, causing a decrease in pH to such an extent that the casein becomes insoluble. This makes the milk much more viscous. The bacteria also produce other metabolites, the kind and concentrations of which depend on the bacterial species.

1.4.6. *Cheese making*

Cheese making milk can be clotted by adding rennet, which contains a specific proteolytic enzyme. The enzyme transforms the casein micelles in such a way that they start to coagulate. The resulting gel can be broken into pieces; stirring the material then results in the formation of curd particles and whey. The curd contains the micellar casein and most of the fat, the liquid whey contains most of the water-soluble components of the milk and some protein split off casein by the rennet. The curd is further processed to form cheese.

1.5.

Self-check 1	Written test

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

Test I Short Answer Questions

1. Write the most common type of processes applied in products processing? (5pts)

2. List type of changes in dairy products processing?(3 pts)

Test II Write true if the statement is correct and false if statement is incorrect

1. Biochemical changes can occur because milk contains active enzymes (2pts)

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

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

Score = _____

Rating: _____

Information Sheet 2 Identifying and taking corrective action non-conformance in processing, handling and storage

2.1 Definition non-conformance

Nonconformity is the failure to meet one or more of the existing requirements in ISO 9901. When an organization finds itself outside of regulatory boundaries, it must get the problem under control before continuing business.

2.2 Non-conforming product

Includes raw materials, work in process and finished product that does not meet specification. It also includes equipment that has been found to be non-conforming. Document label and identify products and equipment that are rejected or quarantined pending the results of inspection.

The procedures or practices adopted could include:-

- The designation of an area for the storage of non-conforming stock. The perimeter could be marked and/or be distinguished with appropriate signage.
- Using stickers or signs that identify the status of the product.
- Records of disposition of any affected product.
- Retain records of customer complaints and their investigation.
- The procedure will outline the responsibility for investigating customer complaints, initiating follow up actions and communicating back to the customer how the complaint has been resolved. Procedure should include criteria for the determination of the validity of complaints

2.3 Definition of correction

Correction is action taken to eliminate a detected nonconformity or defect (adapted from ISO 9000). A correction can be made in conjunction with undertaking corrective action. For a product nonconformity, correction might include reworking the part, accepting the

nonconformance through the concession process, replacing the product, or scrapping the product.

2.1. Definition of corrective action

Action implemented to address the root-cause(s) and contributing cause(s) of the undesirable condition, situation, nonconformity, or failure; action taken to prevent recurrence. As part of the corrective action process you must identify all the causes (root-cause and contributing causes) that have or may have generated an undesirable condition, situation, nonconformity, or failure.

2.2. Identifying nonconformities

Corrective action is initiated by a nonconformance arising from processes which include:

- Inspection and checking activities
- Internal SEQ audits
- Customer complaints
- Process control
- Review recommendations

2.6. Apply corrective action

The decision to apply or not apply the corrective action process should be made by the appropriate level of management within the company, based on the level of risk. This guidance provides a 6-step methodology for applying corrective action and meeting the requirements in each of these clauses.

Factors that can trigger the corrective action process

1. A safety impact that affects the product or personal;
2. Product performance and/or reliability issues;
3. High impact on production and/or maintenance operations;
4. Repetitive problems to one part of the activity/process, or similar problems across many activities/processes;
5. Difficulty in detecting the nonconformity;
6. By customer request;
7. Significant quality or management system issues;

8. Complex problem that cannot be solved without assistance of others not located where the problem occurred.

Self-check-2	Written test

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

Test I: Short Answer Questions

1. **Define nonconformance** ?(2pts)

2. **Define of corrective action? (2 pts)**

3. **List Non-conforming product**?(2pts)

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

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

Score = _____

Rating: _____

Information Sheet 3.Investigating and reporting causes of non-conformance

3.1. Identifying and correcting nonconformities

Corrective action initiated by a nonconformance arising from processes, which include:

- Inspection and checking activities
- Internal audits
- Customer complaints
- Process control
- Management review recommendations

3.2. Investigating non-conformances responsibility

For the initial investigation of all non-conformances shall be with the area manager responsible for the area of operation concerned. The area manager shall as soon as possible and within the guidelines for reporting.

3.4 Six common causes of nonconformance with ISO 9001:2015

These non-conformance's commonly experienced by organizations as they transition to ISO 9001:2015. We break them down by clause.

Common non-conformance by clause

Clause 4- It's a new requirement to identify and define interested parties. Many clients are failing to do this. Also, many organizations are failing to meet the new requirement of monitoring and measuring processes.

Clause 6-In ISO 9001:2015, organizations are required to plan and define actions when changes are being made to the quality management system (QMS). Auditors find that this isn't effectively implemented.

ISO 9001:2015 requires a risk evaluation throughout an entire organization. Risk is often not properly evaluated in parts of an organization's business, such as warehousing and external/internal issues.

Clause 7-It is mandatory to have accuracy with measuring devices. Some organizations are not using the appropriate tool/measuring device for a measurement taken, so the result is inaccurate.

A new requirement for ISO 9001:2015 is the need for an organization to improve its knowledge. It is essential that this knowledge/training/education is captured, but auditors frequently find that it's not. An example of this is training records that are not retained.

Clause 8- This section focuses on the control of operations, which should be carefully examined when an organization is preparing for an audit. Often, auditors find that first piece inspections aren't effective and not documented.

Receiving inspections are also cited as ineffective. The process for approving and disqualifying vendors that aren't up to code is often not defined. Also, many organizations aren't clearly defining materials involved in their processes or manufacturing.

Clause 9- The language may have changed from 2008 to 2015 but the requirements for internal audits remain the same. Many internal audit systems are ineffective, and organizations don't meet the requirements for clause 9.

Common shortcomings include the lack of addressing the mitigation of risk or actions taken regarding the performance of the QMS.

Clause 10- This clause addresses nonconforming materials and corrective action. It's virtually the same as 2008, but 2015 add customer complaints language.

Customer complaints are often recorded, but organizations don't define or document a corrective action, so they fail to meet the 2015 standard.

3.4. Detail report on the investigation include

- Type of non-conformance
- Identified causes of non-conformance
- Initial recommendations
- Consultation with employee and other stakeholders undertaken

3.3. Reporting of hazards

All situations with the potential to cause injury environmental contamination or a quality issue will be identified as non-conformances and shall be reported by the person identifying the non-conformance on an Injury Incident report Form

3.4. Implementing appropriate actions

The Manager shall allocate action to be taken in writing to the relevant Business unit representative by completing a corrective action report form. All actions must be recorded in the company database.

3.5. Recording the results

All non-conformances shall be recorded on which shall be available in a read only format to all employees to determine progress.

3.6. Reviewing

The effectiveness of the corrective action On a quarterly basis all outstanding recommendations (corrective actions) shall be circulated to the responsible business unit manager who will review the effectiveness in consultation with site employees.

3.7. Documentation

Documents and forms relating to this procedure are prefaced with the procedure number and stored in the system document library.

Table 1 Non-Conformance Report

1. Non-Conformance Report		
NCR #	**Event Date**	**1.** The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
Status	**Verification**	
Raised By	**Closed by**	
Title	**Title**	
Raised On	**Closed on**	
2. Issue Description		2. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
3. Actions Taken to Fix		3. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
4. Corrective Verification – Object Evidence of Actions Taken		4. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
5. Correction Acceptance		5. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
Construction	**Signature**	
Quality	**Signature**	
Engineer	**Signature**	
6. Root Cause Analysis		6. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.
7. Corrective Actions		7. The general details of the non-conformance. Identify who found the issue and important dates toward close. QMS may require someone to actually accept the NCR.

Self-Check- 3	written test

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

Test I: Short Answer Questions

1. List down the six common causes of non-conformance with ISO 9001:2015? (6pts)

Test II:write true if the statement is correct and false if the statement is incorrect

1. Clause 8 section focuses on the control of operations? (2pts)

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

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

Score = _____

Rating: _____

Information Sheet4. Determining and implementing corrective action

4.1. Corrective and preventive action /CAPA/

It 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 non-conformance.

4.2. Corrective action:

Action taken to eliminate the causes of non-conformities or other undesirable situations, so as to prevent recurrence.

4.3. Preventive action:

Action taken to prevent the occurrence of such non-conformities, generally as a result of a risk analysis. Preventive control systems emphasize prevention of hazards before they occur rather than their detection after they occur

In certain markets and industries, CAPA may be required as part of the quality management system. Failure to adhere to proper CAPA handling is considered on good manufacturing practices. CAPA is used to bring about improvements to an organization's processes, and is often undertaken to eliminate causes of non-conformities or other undesirable situations.

CAPA is a concept within

- Good manufacturing practice (GMP)
- Hazard Analysis and Critical Control Points (HACCP) and
- ISO business standards.

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).

4.4. 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.

- 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 is part of the overall quality management system (QMS).

4.5. Non- Conformance Report

If a nonconformity has been identified, a non-conformance report (NCR) can be filled out by supervising personnel. NCR's help keep the problem under control and are the first step toward fixing the infraction. A non-conformance report should notify the violator of the ISO 9001 requirement that is being violated, detail the infraction, and outline a plan of action for fixing the violation.

NCR's should be constructive rather than reprimanding. They should be thorough so that the violator knows exactly what went wrong and how to fix the problem. This will ensure that the nonconformity does not happen again. Informations to include when filing an non-conformance report;

- ISO 9001 requirement that is being violated
- Circumstances surrounding the violation (what went wrong)
- Plan of action to correct the problem
- Details on how to prevent the problem in the future;
- The first step in correcting nonconformity is identifying what went wrong in the first place.
- The second step will show the violator exactly what went wrong on their part. This way there is no question of how the requirement is violated.
- The third step is to create a plan of action. This is arguably the most important step and doing it correctly will hopefully fix the violation so that minor problems don't become major nonconformities.

A well-writtennon-conformance report foresees that this problem can happen again and takes measures to inform and ensure that the same mistake is not made twice. A good

supervisory team will make note of violations to ISO 9001 and how they overcame them, rather than hiding their mistakes for them to grow larger.

Self-Check-4	Written test

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

Test I: Short Answer Questions

1. Define corrective action? (3pts)
2. Define preventive action? (3pts)
3. How to implemente corrective actions? (4pts)

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

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

Score = _____

Rating: _____

Information Sheet 5.Taking action recurrence of non-conformance

5.1. Non-conformance

Non-conformance (NC) is an ISO 9000 audit designation indicating the quality management system or a portion of it does not meet the requirements established by ISO 9000. Non-conformance is a sign that something went wrong in a service, process, and product or in the system itself by not meeting a certain set of specifications. The existence of a non-conformance implies that some aspects of a company's standard operating procedures not being followed or they need to be modified or even updated.

Deviations identified through internal and external audits, customer complaints, material inspection or routine testing. A non-conformance report is then prepared. The purpose of the report is to document the details of a deviation from expectations. The report helps define the problem in a clear, logical and concise way so that management can take steps to implement changes. ISO 9001:2015 no longer requires a documented procedure, but one must still keep records of the nonconformity and what was done to correct it.

Non-conformance could lead to rework, product recall, and decreased productivity. Corrective actions are reactive the steps you take once the problem has occurred. Preventive actions are not only to prevent a particular instance of non-conformance from re-occurring, but also to prevent one from ever occurring.

5.2. Ways to prevent or minimize non-conformance:

5.2.1. Management Review

Management reviews generally conducted once a year and present an opportunity to review the company's existing quality policy as well as set new objectives for the rest of the year. New objectives can be invaluable for minimizing non-conformance.
Product changes, new requirements, new processes, change management etc. all reviewed. The management review process can identify and correct any current or incipient deficiencies before they might revealed by an audit or incident. Routinely

reviewing the organization's process helps spur continuous improvement. A system should be in place for implementing any resulting plans for improvement or corrective action and verifying their effectiveness**.**

5.2.2. Review

A review is usually a 'senior management' exercise. It is important to conduct a similar exercise with the actual employees who are involved in the day-to-day process. These employees have an in-depth understanding of various processes and how related. They have vast knowledge about the product and more importantly about past non-conformance issues. They very well could have been first to respond to a crisis and would have played a crucial role in analyzing the situation and solving an issue. On the other side, this discussion could reveal a knowledge gap crucial to fixing non-conformance. An end-to-end understanding is crucial in setting up new objectives to minimize non-conformance. In addition, understanding the process followed by lower-level employees could highlight pain points and provide key insight into potential areas of non- conformance, those which cannot be identified in a management review or audit.

5.2.3. Internal Audit

An audit is simply another form of testing i.e. comparing things as they are to how they ought to be. Internal Audits need to be scheduled at regular intervals to check whether the quality system conforms to requirements and to ensure the system's efficacy. Unlike an external audit, all the processes need not be audited at the same. Internal audits can be conducted as a series of smaller audits, with different processes audited at different times. The frequency of audit can also be set depending on the process in question. With changing internal and external dynamics, the criteria for the audit can be decided prior to the audit rather than the planning stage. Any previous findings, past audit conclusions, and pre-defined questions all become valuable data. Observations raised during internal audits could be classed as preventive actions as they can suggest improvements within the system to prevent non-conformances from occurring in the future.

5.2.4. Feedback

While all customer complaints are recorded and must be actioned, customer feedback also plays a role in minimizing non-conformance. Feedback from customers helps to understand potential non-conformance issues and is an opportunity for improvement. Customer suggestions may prevent any issues from being raised in the future. Negative as well as positive feedback is valuable data. Spending time to analyze could help spot trends and patterns. Feedbacks help to dig into the root cause of the issue which may not always be obvious. Understanding the root cause can help differentiate a temporary lapse from a process flaw.

No system is perfect, therefore problems with the system i.e. non- conformance will occur. The aim is to resolve the non-conformance as quickly as possible and prevent any recurrence.

Recording non-conformities helps analyze negative trends, examine root cause, and eliminate the cause of the problems. Corrective actions should also include the longer-term actions to ensure the problem will not occur again.

While corrective actions are reactive, preventive actions are pro-active. A preventive action can prevent the occurrence of an issue or stop it from becoming too severe. A preventive mindset helps to reanalyze the product and process, get a different perspective and help improve the system as a whole in a timely manner.

Prevention can also be thought of as risks and opportunities. Identifying the potential source of problems, their effects and the likelihood of occurrence is the first step in risk management. This is followed by analyzing whether the associated costs with reducing the risk are worth it. Mitigating risks and avoiding unnecessary costs are some of the biggest and obvious reasons to minimize non-conformance.

Effectively managing non conformances and preventive actions is an integral part of an organization’s continuous improvement plan. This should result in fewer defective products and processes and more satisfied customers.

Self-Check. 5	Written test

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

Test I: Short Answer Questions

1. List the Ways to prevent or minimize non-conformance?(3pts)

Test II: Write true if the statement is correct and false if the statement is incorrect

1. Non-conformance could lead to rework, product recall, and decreased productivity (2pts)

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

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

Score = _____

Rating: _____

Information Sheet 6. Reporting action

6.1. Introduction

Workplace reports are written to provide information and, therefore, should be objective and based on facts. They should also be clear, concise and easy to understand, avoiding unnecessary details and wordiness. The tone of an internal report can be conversational or semi-formal depending on the purpose of the report and the relationship between the writer and the recipient.

6.2 Workplace hazard reporting

All hazards that are found in the workplace should be reported immediately to a supervisor, the safety department or management. This is a standard practice that should exist in any workplace and every employee should be made aware that this is the appropriate action to take should they encounter any hazard or potential hazard they discover. However, many employees may feel (justified or not) that the hazards they encounter, sometimes on a daily basis, are *just how things* are and reporting them is not necessary. Designing, setting up and communicating a Hazard Reporting Program is a good idea for any business to help avoid this potentially dangerous attitude. Implementing a Hazard Reporting Program will help ensure that your workplace is safer for your employees and reduce costly incidents or business interruptions.

All employees should be trained in hazard recognition and avoidance. Hazard Reporting is a critical part of this training so that employees know exactly what to do when they encounter a hazard they can't immediately correct. Don't get overwhelmed by the word "training" because you can design the training to be as simple as you need for your specific team. Depending on the types of hazards your employees might encounter, this training could be a mandatory all-day in-person training session for high-hazard jobs, or on-the-job training led by a competent supervisor, or even a 30-minute safety meeting. For low-hazard jobs, at least consider an annual online training or email reminder so employees understand hazard reporting is not only acceptable but also expected.

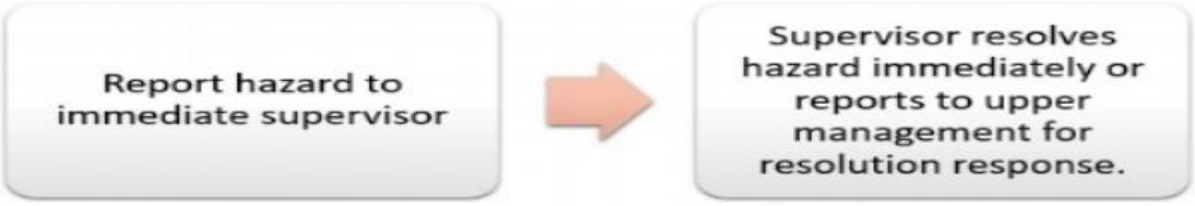
6.2. Points should be emphasized during hazard reporting training,

- **What is an unsafe condition that should be reported?** This is any circumstance found in the workplace that could allow an incident to occur that might harm people, equipment or property.
- **What is an unsafe act that should be reported?** This is any behavior that could lead to an incident that might harm people, equipment or property. Unsafe acts might not be intentional.
- **What should be done if an unsafe condition or act is witnessed in the workplace?** This depends on the hazard reporting procedure in your workplace so be specific. Let employees know exactly what steps they should take which could be filling out a form or verbally telling a supervisor.
- **When should a hazard be reported?** Any unsafe condition or act should be reported immediately, or at the next available safe opportunity that the employee has to do so.
- **What should employees expect after a hazard is reported?** Let employees know what the expected time frame is for corrective and preventative measures that are expected and how employees can follow-up on the corrections progress, if needed.
- **Where can employees find a copy of the Hazard Reporting Procedure?** Are hard copies of procedures kept at headquarters, or is the Safety Manual found online on the company's intranet? It's important that employees know how they can access all company policies and procedures on their own.

You can start simple when it comes to implementing a hazard reporting system in your workplace, and then let this program evolve as the company grows, significant workforce is hired or new industry sectors are added.

Here are some examples of what a hazard reporting program might look like, simple to more complex. Design a program that works for your company and your employees. Document the procedure in a step-by-step format that is easy to understand and the communicate to your employees what the process is and where they can find the procedure to reference at any time.

Example 1:



Example 2:

Example 3:

Example 4:

Example 5:

If employees are reluctant to report hazards in the workplace, here are some great ways to improve the quality of hazard reporting in your safety program.

1. Make reporting as easy as possible.
2. Ensure there is no negative stigma and no punishment attached to hazard reporting.
3. Give recognition to those who submit hazard reports.
4. Engage workers in the resolution of hazards to ensure the correction is satisfactory for all involved and does not create additional hardships inadvertently.
5. Keep an open discussion about safety issues, perhaps following up on the specific hazard reported at the next safety meeting.
6. Never assign blame to an individual when it comes to hazards found. Rather, attribute hazards to “systems” like insufficient budget assigned for tool replacements, lack of training, or comprehensive process needed.
7. Post signs or posters around the workplace that reinforces the message that unsafe conditions and acts must be reported.

Self-Check 6	Written test

Directions:

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

Test I: Write true if the statement is correct and false if the statement is incorrect

1. All hazards that are found in the workplace should be reported immediately to a supervisor, the safety department or management? (2 pt).

2. Workplace reports are written to provide information based on facts.? (2pt)

3. When preparing report make as easy as possible? (2pt)

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

Score = _____

Rating: _____

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

Information Sheet 7.Conducting work with environmental work place guideline

7.1. Introduction

Having a safe and healthy physical work environment, including amenities and facilities, is critical to eliminating and controlling risk in the workplace. This includes ensuring the work environment, facilities and amenities are compliant with legislative and other identified requirements

7.2. Conduct work-

A person conducting a business or undertaking at a workplace must ensure, so far as is reasonably practicable, the following:

- The layout of the workplace allows, and the workplace is maintained so as to allow, for persons to enter and exit and to move about without risk to health and safety, both under normal working conditions and in an emergency,
- Work areas have space for work to be carried out without risk to health and safety,
- Floors and other surfaces are designed, installed and maintained to allow work to be carried out without risk to health and safety,
- Lighting enables:
  i. Each worker to carry out work without risk to health and safety
  ii. Persons to move within the workplace without risk to health and safety,
  iii. Safe evacuation in an emergency,
- Ventilation enables workers to carry out work without risk to health and safety,
- Workers carrying out work in extremes of heat or cold are able to carry out work without risk to health and safety,
- Work in relation to or near essential services does not give rise to a risk to the health and safety of persons at the workplace.

A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the provision of adequate facilities for workers, including toilets, drinking water, washing and eating facilities. These facilities must be in good working order, clean, safe and accessible. When considering how to provide and maintain facilities that are adequate and accessible, a person conducting a business or undertaking must consider all relevant matters including:

- The nature of the work being carried out at the workplace
- The nature of the hazards at the workplace
- The size, location and nature of the workplace
- The number and composition of the workers at the workplace.

7.3. Facilities

The work environment, facilities and amenities are provided for basic health and welfare of employees and visitors. These include items such as:

- **Toilets-** Access to clean toilets must be provided for all workers while they are at work. The number and specification of toilets for University buildings is set out by the National Construction Code of Australia. Further information is available in the Code of Practice: Managing the Work Environment
- **Dining rooms**- Where work processes may cause risk to health, a separate eating area protected from dust, fumes or noise arising out of the work process is to be available. The area should be suitable for dining, have access to a refrigerator, enable easy cleaning and kept free of tool, materials, and vehicles and be protected from the weather
- **Drinking water-** Drinking water free potable drinking water which is cool, clean and palatable is required at each place of work. The supply of drinking water should be:
  - ✓ positioned where it can be easily accessed by workers
  - ✓ close to where hot or strenuous work is being undertaken to reduce the likelihood of dehydration or heat stress
  - ✓ separate from toilet or washing facilities
  - ✓ below 24 degrees Celsius
  - ✓ supplied in a hygienic manner e.g. upward jet fountain, via disposable or washable drinking containers
- **Hand Washing faciilitess-** to be provided to enable workers to maintain good standards of personal hygiene. As a guide hand washing basins should be provided in a ratio of 1 per every 30 workers or part thereof. Paper towels, continuous roll towel or hot air dryers are to be supplied with hand washing facilities, as well as appropriate soap, cleaning agents and waste receptacles.

- **Change Rooms**-Persons required to change clothes before and after work should be able to access a change room. This includes workers who need to:
  - ✓ wear personal protective clothing or uniforms while they are working
  - ✓ leave their work clothing at the workplace.
  - ✓ It should be private and contain lockers for storage of personal belongings.
  - ✓ the door should also be capable of being locked.
  - ✓ separate change rooms for males and females must be provided.
  - ✓ the changing room space should allow a clear space of at least 0.5m^2 for each worker.
- **Shower Facilities**-where dirty, hot or hazardous work is undertaken showering facilities should be provided. Showers should have:
  - ✓ a floor area of not less than 1.8m2
  - ✓ a slip resistant surface that is capable of being sanitized
  - ✓ partitions between each shower that are at least 1650mm high and no more 300m above the floor
  - ✓ an adjacent dressing area for each shower containing a seat and hooks
  - ✓ a lockable door enclosing the shower and dressing cubicleWhere the substances or materials handled are contaminants, decontamination facilities e.g. safety showers are to be available.
    - Lockers
    - Accommodation
    - waste receptacles
    - first aid facilities/rooms (refer to first aid guidelines)

7.4. Maintenace

The work environment, facilities and amenities are required to be maintained in a safe and healthy condition, and need to be hygienic, secure and in a serviceable condition. This includes replenishment of consumables, repair of broken or damaged furnishings and equipment and ensuing cleanliness of these areas.

7.5. Inspection and Monitoring

The work environment, facilities and amenities need to be periodically inspected to ensure they conform to relevant legislation, standards and codes of practice and are maintained and serviced appropriately.

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: Write true if the statement is correct and false if the statement is incorrect

1. The work environment, facilities and amenities are provided for basic health and welfare of employees and visitors. (2pts)
2. Access to clean toilets must be provided for all workers. (2pts)
3. The work environment, facilities and amenities need to be periodically inspected (2pts)
4. Drinking water should be positioned where it can be easily accessed (2pts)
5. The work being carried out at the workplace according to requirment(2pts)

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

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

Score = _____

Rating: _____

Answer sheet

Test I

1._____

2. _____

3. _____

4._____

5. _____

AKNOWLEDGEMENT

I would like to express my great appreciation to the TVET instructors and experts of regional TVET bureau, TVET College, and Federal Technical and Vocational Education and Training Agency (FTVETA) who made the development of this learning module with required standards and quality possible.

I also wish thanks and appreciation to the representatives of BEAR II UNESCO PROJECT who covers the financial expenses, scarifying their time and commitments to develop this learning module.

The trainers who developed this learning guide

S. N	Name	Level	Educational Background	Institution	Region	Telephone	E-mail
1	Hirpha Ketema	A	Animal Production	Holeta PTC	Oromia	0969432985	hirphaketema2@gmail.com
2	Tadesu Fikrie	A	Animal Production	Burie PTC	Amhara	0946238747	tadesufikrie2016@gmail.com
3	Mulugeta Tesfaye	A	Dairy Science	EMDIDI	Oromia	0911984834	tmulugeta47@yahoo.com
4	Tesfaye Asrat	B	Animal Science	Motta PTC	Amhara	0923233339	tesfaye99love@gmail.com
5	Abera Shiferaw	B	Animal Production & Health	Holeta PTC	Oromia	0911556155	Aberashiferaw2011@gmail.com
6	Wondye Hatew	B	Animal Production	Holeta PTC	Oromia	0925255341	hare2013@gmail.com
7	Tarekegn Cheo	B	Agricultural & Process Engineering	Hawasa PTC	Sidama	0931239119	tarekegecheo155@gmail.com
8	Geresu Germamo	B	Food Science & Post harvest Technology	Wolayita Sodo PTC	SNNP	0916610590	geresug57@gmail.com
9	Sefi Shiferaw	B	Food Science & Post harvest Technology	Holeta PTC	Oromia	0938872353	sefishiferaw@gmail.com

Federal TVET Coordinator

S. N	Full Name	Organization	Position	Telephone	E-mail
1	Workneh Asmamaw	Federal TVET Agency	TVET Curriculum TTLM Expert	0955205855	workasmamaw@gmail.Com

Reference

Contamination, Preservation, and Spoilage of Milk and Milk products Anil Shrestha MSc Medical Microbiology

Walstra, Pieter. Dairy science and technology / Pieter Walstra, Jan T.M. Wouters, T.J. Geurts.2nd ed. 2006 by Taylor & Francis Group, LLC

Francoise Rul. Yogurt: microbiology, organoleptic properties and probiotic potential. Fermented Foods

R.K. Robinson, Ed., *Modern Dairy Technology,* Vol. 1, *Advances in Milk Processing,* and Vol. 2, *Advances in Milk Products,* 2nd ed., Elsevier, London,1993.

https://advisera.com/9001academy/blog/2014/01/13/five-steps-iso-9001-nonconforming-products/

http://www.sustainingedge.com/identifying-process-nonconformity/

https://www.isotracker.com/blog/6-common-causes-of-nonconformance-with-iso-90012015/

https://www.thebalancesmb.com/i-received-a-1099-misc-form-what-do-i-do-with-it-398610

https://www.fda.gov/corrective-and-preventive-actions-capa

Answer Sheet

Module Title: Applying Process Knowledge to Solve Production Problem

LO#1 Monitor milk supply and quality

1. Write the classification scheme of non-conformities of ingredient! (4%)
   - Minor Non-conformance
   - Major Non-conformance
   - Critical Non-conformance
2. Write the sources of raw milk contamination! (2%)
   - On the Farm
   - Transportation
3. Write the causes of non-conformance in milk and milk products
   - Off-flavors
   - Mechanical causes
4. Write the mechanical causes of non-conformances
   - Flavor changes
   - Physical change
   - Spoilage
   - Temperature

Self-check .2.

1. Write the **types contamination**/ deterioration of raw materials in Non-conformance
   - Mechanical causes:
   - Physio- biochemical causes:
   - Microbial causes:
   - Physical causes:
2. Write the investigation of document in industry!
   - ✓ Material
   - ✓ The problem
   - ✓ Evaluation
   - ✓ Segregation
   - ✓ The investigation (if any)
   - ✓ disposition and signatures
3. Mention the causes of milk and cream spoilage
   - Gas Production
   - Proteolysis Repines

- Changes in Milk fat
- Alkali production

Self-check.3

1. Write the mechanism of presentation of non-conformance of microorganism (5%)

- Use of heat
- Use of low temperature
- Drying
- Use of preservatives
- Using quality and clean water for animal and clean milk equipment

2. Write the types of Heat treatment standard in cheese making!(5%)

- Pasteurization
- extended shelf life (ESL) **treatment**
- ultra-high temperature (UHT) **treatment**.

Self-check. 4

1. Write prevent method for recurrence non-conformance milk!(6%)

- Free of debris and sediment
- Free of off-flavors
- Free of abnormal color and odor
- low in bacterial count
- Free of chemicals (e.g. antibiotics, detergents)
- Normal composition and acidity

2. Write the Quality control achieving action in the raw milk!(4%)

- Corrective Action
- Preventive action

3. What are the correct packaging procedures! (6%)

- they must be non-toxic and compatible with the specific foods(food graded)
- Sanitary protection
- moisture and fat protection
- Gas and odor protection
- Light protection
- Resistance to impact
- Transparency

- Tamper proneness
- Ease of opening
- Pouring features
- Reseal features
- Ease of disposal
- Size, shape, weight limitations
- Appearance, printability

Self-check 5.

1. Write the top five tips of non-conformance and corrective action!(5%)

1) Scope
2) Responsibility
3) Chase
4) Timescales
5) Evidence