PRINCIPLES OF DAIRY MICROBIOLOGY

ISCED UNIT CODE: 0721 451 08A

TVET CDACC UNIT CODE: DA/CU/PM/CC/04/5/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: **Apply Dairy Microbiology Principles**

Duration: 80 hours

UNIT DESCRITION

This unit specifies the competencies required by a Dairy Plant Technologist level 6 to apply dairy microbiology principles. It involves utilizing dairy microorganism, applying dairy hygiene practices, and controlling dairy microorganisms.

Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Utilize dairy microorganism	50
2.	Apply dairy hygiene practices	20
3.	Control dairy microorganisms	50
Total		**120**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Utilize dairy microorganism	1.1 application of microbiology in dairy technology 1.1.1 milk fermentation 1.1.2 control of milk borne diseases 1.1.3 preservation of milk 1.1.4 waste management	• Practical • Third party report • Portfolio of evidence • Written tests • Oral questions

	1.2 Beneficial microorganisms for milk fermentation 1.2.1 Bacteria *1.2.1.1 Lactobacillus bulgaricus* *1.2.1.2 Streptococcus thermophilus* *1.2.1.3 Lactococcus lactis* 1.2.1.4 Bifido bacteria 1.2.2 Fungi *1.2.3 Penicillium sp* 1.2.4 Mucor *1.2.5 Rhizopus* *1.2.6 Aspergillus* 1.3 Fermentation process 1.4 Factors affecting fermentation process *1.5* Indicators of fermentation process *1.6* Symbiotic relationship in fermentations *1.7* Enzymatic activity *1.8* Factors affecting enzymatic activity *1.9* Fermentation process records	
2. Apply dairy hygiene practices	2.1 Plant hygiene 2.2 Definition of terms 2.2.1 sanitation 2.2.2 Hygiene 2.2.3 Sanitiser 2.2.4 Cleaning 2.2.5 Sterilisation 2.2.6 Detergent 2.3 Dairy plant cleaning	• Practical • Third party report • Portfolio of evidence • Written tests • Oral questions

	2.3.1 Cleaning in place 2.3.2 Cleaning out of place 2.4 Inspection of dairy plant 2.4.1 Hygiene and sanitation 2.4.2 Facility layout and design 2.4.3 Equipment and machinery 2.4.4 Raw material handling 2.5 Microbial tests 2.5.1 Standards plate count 2.5.2 Total plate count 2.5.3 Coliforms plate count 2.5.4 Yeast and mould count 2.6 Dairy plant environment hygiene 2.6.1 Processing area 2.6.2 Packaging area 2.6.3 Dairy laboratory 2.6.4 Waste disposal area 2.7 Worker's hygiene 2.8 Dairy hygiene records	
3. Control dairy microorganisms	3.1 Harmful dairy microorganisms *3.1.1 Salmonella* *3.1.2 Escherichia coli* *3.1.3 Listeria monocytogenes* *3.1.4 Staphylococcus aureus* 3.2 Control of harmful dairy microorganisms 3.2.1 Hygienic practices 3.2.2 Heat treatment 3.2.3 Low temperature storage	• Practical • Third party report • Portfolio of evidence • Written tests • Oral questions

	3.2.4 Packaging 3.3 Harmful dairy microorganisms Control records	

Suggested Methods of Instruction

- Demonstrations
- Practical
- Group discussion
- Direct instruction
- Project

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
	Textbooks		5 pcs	1:5
	Production Manuals		5	1:5
3	Flash Cards	Assorted	5	1:5
4	Whiteboard		1	1:25
5	Flip chart		1	1:25
8 .	Assorted colour of whiteboard markers	For trainers Use		
B	**Learning Facilities & infrastructure**			
9.	Lecture/theory room		1	1:25
10	Microbiology Laboratory		1	1:25
2.	Workshop		1	1:25

C	**Consumable materials**			
3.	Slides		100	4:1
4.	Petri dishes		100	4:1
5.	Cover slips		100	4:1
6.	Test tubes		200	8:1
7.	Assorted pipettes		100	4:1
8.	Inoculating loops		25	1:1
9.	Swabs		200	8:1
10.	Culture media	Assorted	500g each	-
11.	Lab coat		-	-
12.	Head covers		25	1:1
13.	Medical gloves		200pcs	-
14.	Sodium hydroxide		500 gms	-
15.	Spirit		1 lt	-
16.	Nitric acid		1 ltr	-
17.	Antiseptics		1ltr	-
18.	Brooms		25	1:1
19.	Squeezers		25	1:1
20.	Brushes		25	1:1
D	**Tools and Equipment**			
21.	Source of heat		5 pcs	1:5
22.	Incubator		5 pcs	1:5
23.	Microscope		1pc	1:25
24.	Colony counter		1 pc	1:25
25.	Autoclave		1pc	1:25

26.	Digester		1	1:25
27.	Grider		1	1:25
28.	Incinerator		1	1:25
29.	Test tube racks		5	1:5
30.	Clean bench for Microbiology		1	1:25
31.	UV chamber		1	1:25
32.	Centrifuge		1	1:25
33.	Refrigerator		1	1:25
34.	Freezer		1	1:25
35.	Analytical balance		5	1:5
36.	Water bath		5	1:5
37.	CIP unit		1	1:25
38.	COP unit		1	1:25