FERMENTED MILK PRODUCTS PROCESSING

ISCED UNIT CODE: 0721 351 03A

TVET CDACC UNIT CODE: DA/CU/PM/CR/03/4/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: **Process Fermented Milk Products**

Duration: 180 Hours

Unit Description

This unit specifies the competencies required by a Dairy Plant Technician Level 6to process Fermented Milk Products. It involves producing Yoghurt, Cultured and Kefir milk products.

Summary of Learning Outcomes

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

S/No	Learning Outcomes	Duration (Hours)
1.	Produce yoghurt	80
2.	Produce cultured milk	50
3.	Produce kefir milk	50
Total		**180**

Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Produce Yoghurt.	1.1 Yoghurt Production concepts 1.1.1 Definition of terms 1.1.1.1 Inoculation 1.1.1.2 Fermentation	• Written tests • Interviews/ Oral questions • Practical • Individual/group assignments

	1.1.1.3 Incubation 1.2 Dairy Culture 1.2.1 Qualities/characteristics 1.2.2 Storage conditions 1.2.3 Factors that affect starter culture viability 1.3 Types of fermentation 1.3.1 Aerobic, anaerobic, Uncontrolled, Controlled, Homo fermentation, Hetero fermentation, Lactic acid fermentation, Propionic acid fermentation, Alcohol fermentation, Citric acid fermentation, Coliform gassy fermentation, Butyric acid fermentation 1.4 Types of yoghurt 1.4.1 Set yoghurt 1.4.2 Stirred Yoghurt 1.5 Raw milk Sampling 1.5.1 Definition of terms 1.5.2 Sampling methods 1.5.3 Sampling procedures 1.6 Raw milk quality Analysis 1.6.1 Raw milk quality tests 1.6.2 Organoleptic 1.6.3 Clot On Boiling	• Case Studies • Third party report

	1.6.4 Compositional test 1.6.5 Resazurin test 1.6.6 Alcohol test 1.6.7 Lactometer test 1.6.8 Antibiotic test 1.6.9 pH test 1.7 Milk additives 1.7.1 Types (Sugar or sweetener; Stabilisers; Milk powder, Flavour, Colour) 1.7.2 Role of milk additives 1.8 Yoghurt making tools, equipment and materials 1.8.1 Pasteurization Materials 1.8.1.1 Raw milk 1.8.1.2 Milk powder 1.8.1.3 Sugar 1.8.1.4 Thermophilic live culture 1.8.1.5 Packaging material 1.8.1.6 Flavour 1.8.1.7 Food colour 1.8.2 Yoghurt making equipment 1.8.2.1 Clarifier 1.8.2.2 Homogenizer 1.8.2.3 Pasteurizer 1.8.2.4 Incubator/fermentation tank 1.8.2.5 Packaging machine	

	1.8.2.6 A.I 1.9 Yoghurt making process 1.9.1 Pre-warming 1.9.2 Milk standardization 1.9.3 Homogenization 1.9.4 Pasteurization 1.9.5 Cooling 1.9.6 Inoculation 1.9.7 Incubation 1.9.8 Breaking the coagulum 1.9.9 Addition of flavour and colour 1.9.10 Heat treatment of yoghurt 1.10 Quality evaluation of yoghurt 1.10.1 Sensory evaluation 1.10.1.1 Principles of sensory evaluation 1.10.1.2 Judging and grading 1.10.2 Shelf life 1.10.3 Yield 1.11 Packaging of Finished yoghurt product 1.11.1 Packaging machines 1.11.2 Packaging materials 1.11.3 Packaging methods 1.11.3.1 Aseptic packaging 1.11.3.2 Hermetic packaging 1.11.4 Importance of Packaging	

	1.12 Storage of yoghurt 1.12.1 Definition of terms 1.12.2 Storage conditions 1.12.3 Storage principles; FIFO 1.12.4 Storage equipment 1.13 Hygiene and sanitation of yoghurt processing equipment 1.13.1 Cleaning procedures 1.13.2 Sanitization methods 1.14 Waste disposal 1.14.1 Methods of waste disposal 1.14.2 Importance of waste disposal 1.15 Record-keeping 1.15.1 Types of records 1.15.2 Importance 1.16 Smart and Sustainable Systems 1.16.1 AI application 1.16.2 Sustainable packaging options 1.16.3 Sustainable waste disposal	
2. Produce cultured milk	2.1 Production of Cultured Milk 2.1.1 Definition of terms 2.1.1.1 Mesophilic Culture 2.1.1.2 Cultured Milk 2.2 Cultured milk processing equipment and materials 2.2.1 Cultured milk Materials	• Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies • Third party report

	2.2.1.1 Raw milk 2.2.1.2 Milk powder 2.2.1.3 Mesophilic live culture 2.2.1.4 Packaging material 2.2.2 Cultured Milk equipment 2.2.2.1 Blender 2.2.2.2 Cream separator 2.2.2.3 Homogenizer 2.2.2.4 Pasteurizer 2.2.2.5 Milk silo tank 2.2.2.6 Packaging machine 2.3 Cultured milk processing 2.3.1 Raw milk standardization 2.3.2 Pasteurization 2.3.3 Cooling 2.3.4 Inoculation 2.3.5 Incubation 2.3.6 Breaking coagulum 2.4 Milk homogenization 2.4.1 Definition of terms 2.4.2 Homogenization equipment 2.4.3 Homogenization principles 2.4.4 Factors influencing homogenization 2.5 Quality evaluation of cultured milk product 2.5.1 Sensory Evaluation	

	2.5.1.1 Principles of sensory evaluation 2.5.1.2 Judging and grading 2.5.2 Yield 2.5.3 Shelf life 2.6 Packaging of cultured milk products 2.6.1 Packaging machines 2.6.2 Packaging materials 2.6.3 Packaging methods 2.6.3.1 Aseptic packaging 2.6.3.2 Hermetic packaging 2.6.4 Importance of Packaging 2.6.5 Sustainable packaging options 2.7 Storage of Cultured milk product 2.7.1 Storage conditions 2.7.2 Storage principles; FIFO 2.7.3 Storage equipment 2.8 Hygiene and sanitation of cultured milk processing equipment 2.8.1 Cleaning procedures 2.8.2 Sanitization methods 2.9 Waste disposal 2.9.1 Methods of waste disposal 2.9.2 Importance of waste disposal 2.10 Record keeping 2.10.1 Types of records 2.10.2 Importance	

	2.11 Smart and Sustainable Systems 2.11.1 AI application 2.11.2 Sustainable packaging options 2.11.3 Sustainable waste disposal	
3. Produce kefir	3.1 Kefir Production 3.1.1 Definition of Kefir 3.1.2 Characteristics of kefir 3.2 Kefir processing equipment and materials 3.2.1 Kefir Processing Materials 3.2.1.1 Raw milk 3.2.1.2 Kefir grains 3.2.1.3 Packaging material 3.2.2 Kefir Processing equipment 3.2.2.1 Homogenizer 3.2.2.2 Clarifier 3.2.2.3 Pasteurizer 3.2.2.4 Milk silo tank 3.2.2.5 Packaging machine 3.3 Kefir processing 3.3.1 Standardization 3.3.2 Pasteurization 3.3.3 Cooling 3.3.4 Inoculation 3.3.5 Incubation 3.3.6 Separation 3.4 Packaging of kefir milk product	•Written tests •Interviews/ Oral questions •Practical reports •Individual/group assignments Third party report •Case Studies

	3.4.1 Packaging machines 3.4.2 Packaging materials 3.4.3 Packaging methods 3.4.3.1 Aseptic packaging 3.4.3.2 Hermetic packaging 3.5 Importance of Packaging Storage of kefir milk product 3.5.1 Storage conditions 3.5.2 Storage principles; FIFO 3.5.3 Storage equipment 3.6 Hygiene and sanitation of kefir processing equipment 3.6.1 Cleaning procedures 3.6.2 Sanitization methods 3.7 Waste disposal 3.7.1 Methods of waste disposal 3.7.2 Importance of waste disposal 3.8 Record keeping 3.8.1 Types of records 3.8.2 Importance Record -keeping 3.9 1.1 Smart and Sustainable Systems 3.9.1 AI application 3.9.2 Sustainable packaging options 3.9.3 Sustainable waste disposal 3.10 Apply smart and sustainable systems 3.10.1 AI application 3.10.2 Sustainable packaging options	

	3.10.3 Sustainable waste disposal	

Suggested Methods of Instruction

- Demonstrations
- Group discussion
- Direct instruction
- Role play

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
1.	Textbooks		5 pcs	1:5
2.	Production Manuals		5	1;5
3.	PowerPoint presentations	For trainer's use		
4.	Projector		1	1;25
5.	Assorted Flash Cards		5	1;5
6.	Whiteboard		1	1;25
7.	Rolls flip charts		1	1;25
8.	Assorted color of whiteboard markers	For trainers Use		
B	**Learning Facilities & infrastructure**			
1.	Lecture/theory room		1	1:25
2.	Workshop		1	1:25
3.	Laboratory		1	1:25
4.	Site/industry		1	1:25
C	**Consumable materials**			
1.	Raw milk		1ltr	1:5
2.	Pasteurized Milk		1ltr	1:5

3.	Mesophilic culture			
4.	Thermophilic culture			
5.	Kefir			
6.	Ethanol		10 ml	10:5
7.	Resazurin solution		-	-
8.	Antibiotic test kit		-	-
D	**Tools and Equipment**			
1.	Alcohol gun		5 pcs	1:5
2.	Lactometer		5pcs	1;5
3.	Thermometer		5 pcs	1:5
4.	Centrifuge		1 pcs	1:25
5.	Clarifier		1pcs	1:25
6.	Pasteurizer		1 pcs	1:25
7.	Homogenizer		1 pcs	1:25
8.	Lovi bond Comparator		1pcs	1:25