FAT BASED MILK PRODUCTS PROCESSING

ISCED UNIT CODE: 0721 351 04A

TVET CDACC UNIT CODE: DA/CU/PM/CR/04/4/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Process Fat Based Milk Products

Duration: 180 Hours

Unit Description

This unit specifies the competencies required to process Fat Based Milk products. It involves producing dairy cream, dairy butter, dairy ghee and dairy Ice Cream.

Summary of Learning Outcomes

1. Produce dairy cream
2. Produce dairy butter
3. Produce dairy ghee
4. Produce dairy ice cream

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

S/No	Learning Outcomes	Duration (Hours)
1.	Produce dairy cream	45
2.	Produce dairy butter	45
3.	Produce dairy ghee	45
4.	Produce dairy ice cream	45
Total		**180**

Learning Outcomes	Content	Suggested Assessment Methods
1. Produce Dairy Cream	**Theory** 1.1 Dairy Cream manufacturing 1.1.1 Definition of dairy cream 1.1.2 Characteristics of dairy cream 1.1.3 Types of cream	• Practical • Written tests • Interviews/ Oral questions • Individual/group assignments

	1.2 Dairy Cream equipment and materials 1.2.1 Materials 1.2.1.1 Raw milk 1.2.1.2 Milk powder 1.2.1.3 Cream 1.2.1.4 live culture 1.2.1.5 Packaging material 1.2.1.6 Stabilizer 1.2.1.7 emulsifier 1.2.2 Equipment 1.2.2.1 Clarifier 1.2.2.2 Centrifuge 1.2.2.3 Homogenizer 1.2.2.4 Pasteurizer 1.2.2.5 Incubator/fermentation tank 1.2.2.6 Packaging machine 1.3 Dairy Cream processing 1.3.1 Pre-warming 1.3.2 Separation 1.3.3 Neutralization 1.3.4 Cream standardization 1.3.5 Homogenization 1.3.6 Pasteurization 1.3.7 Ripening 1.3.8 Cooling 1.3.9 Ageing 1.4 Quality evaluation of Dairy cream 1.4.1 Sensory evaluation	• Case Studies • Third Party report

	1.4.2 Defects 1.4.3 Overrun 1.4.4 Shelf-life determination 1.5 Packaging of Finished Dairy Cream product 1.5.1 Packaging machines 1.5.2 Packaging materials 1.5.3 Importance of Packaging 1.6 Storage of Dairy Cream 1.6.1 Definition of terms 1.6.2 Storage conditions 1.6.3 Storage principles; FIFO 1.6.4 Storage equipment 1.7 Hygiene and sanitation of Dairy Cream processing equipment 1.7.1 Cleaning procedures 1.7.2 Sanitization methods 1.8 Waste disposal 1.8.1 Methods of waste disposal 1.8.2 Importance of waste disposal 1.9 Record-keeping 1.9.1 Types of records 1.9.2 Importance 1.10 Smart and Sustainable Systems 1.10.1 AI application 1.10.2 Sustainable packaging options 1.10.3 Sustainable waste disposal	

2. Produce butter	2.1 Butter Production 2.1.1 Definition of terms 2.1.1.1 butter 2.1.1.2 butter churning 2.1.2 Types of butter 2.2 Butter processing equipment and materials 2.2.1 Materials 2.2.1.1 Cream 2.2.1.2 Salt 2.2.1.3 Live culture 2.2.1.4 Cold room/refrigerator 2.2.1.5 Packaging material 2.2.2 Cultured Milk equipment 2.2.2.1 Vat 2.2.2.2 Butter churner 2.2.2.3 Continuous butter maker 2.3 Butter processing 2.3.1 Methods of butter processing 2.3.1.1 Batch method 2.3.1.2 Continuous method 2.3.2 Butter processing 2.3.2.1 Loading 2.3.2.2 Churning 2.3.2.3 Draining 2.3.2.4 Washing 2.3.2.5 Salting 2.3.2.6 working 2.4 Quality evaluation in butter	• Practical • Interviews/ Oral questions • Written assessments • Practical reports • Individual/group assignments • Case Studies • Third party report

	2.4.1 Sensory Evaluation 2.4.2 Yield 2.4.3 Shelf –life determination 2.5 Packaging of Butter 2.5.1 Packaging machines 2.5.2 Packaging materials; eco-friendly packaging 2.5.3 Importance of Packaging 2.6 Storage of Butter 2.6.1 Storage conditions 2.6.2 Storage principles; FIFO 2.6.3 Storage equipment 2.7 Hygiene and sanitation of butter processing equipment 2.7.1 Cleaning procedures 2.7.2 Sanitization methods 2.8 Smart and Sustainable Systems 2.8.1 AI application 2.8.2 Sustainable packaging options 2.8.3 Sustainable waste disposal	
3. Produce Anhydrous Milk Fats	3.1 Ghee processing 3.1.1 Definition of ghee 3.1.2 Characteristics f anhydrous milk fat 3.2 Anhydrous milk Fat processing equipment and materials 3.2.1 Materials 3.2.1.1 Cream 3.2.1.2 Butter	• Practical • Written tests • Interviews/ Oral questions • Individual/group assignments • Case Studies • Third party report

	3.2.1.3 Packaging material 3.2.2 Anhydrous Milk fat equipment 3.2.2.1 Vat 3.3 Ghee processing 3.3.1 Methods of ghee processing 3.3.1.1 Direct method 3.3.1.2 Indirect method 3.4 Quality evaluation of ghee 3.4.1 Sensory Evaluation 3.4.2 Yield 3.5 Packaging of Anhydrous milk fat products 3.5.1 Packaging machines 3.5.2 Packaging materials 3.5.3 Importance of Packaging 3.6 AI in ghee making 3.6.1 Roboting 3.6.2 Sustainable packaging options 3.7 Storage of Anhydrous milk fat product 3.7.1 Storage conditions 3.7.2 Storage principles; FIFO 3.7.3 Storage equipment 3.8 Hygiene and sanitation of ghee processing equipment 3.8.1 Cleaning procedures 3.8.2 Sanitization methods 3.9 Smart and Sustainable Systems 3.9.1 AI application 3.9.2 Sustainable packaging options	

	3.9.3 Sustainable waste disposal	
4. Produce Ice Cream	4.1 Ice cream production 4.1.1 Definition of terms 4.1.1.1 ice cream 4.1.1.2 ice cream overrun 4.1.1.3 Hardening 4.1.2 Characteristics of ice cream 4.1.3 Classification of ice cream 4.2 Ice cream processing equipment and materials 4.2.1 Ice-cream Processing Materials 4.2.1.1 Dairy ingredients 4.2.1.2 Non- dairy ingredients 4.2.1.3 Packaging material 4.2.2 Ice-cream Processing equipment 4.2.2.1 Homogenizer 4.2.2.2 Clarifier 4.2.2.3 Pasteurizer 4.2.2.4 Ice Cream Freezer 4.2.2.5 Ageing Tank 4.2.2.6 Blender 4.2.2.7 Refrigerator 4.2.2.8 Packaging machine 4.2.2.9 A.I 4.3 Classification of Ice Cream 4.4 Ice Cream Processing 4.4.1 Selection of Ingredients 4.4.2 Formulation of Ice cream mix	• Practical • Written tests • Interviews/ Oral questions • Individual/group assignments • Case Studies • Third party report

	4.4.3 Blending 4.4.4 Pasteurization 4.4.5 Homogenization 4.4.6 Cooling 4.4.7 Ageing 4.4.8 Freezing 4.4.9 Hardening 4.5 Quality evaluation of ice cream 4.5.1 Sensory Evaluation 4.5.2 Yield 4.5.3 Overrun 4.5.4 Shelf-life determination 4.6 Packaging of ice cream 4.6.1 Packaging machines 4.6.2 Packaging materials; eco –friendly packaging 4.6.3 Importance of Packaging 4.7 Storage of Ice cream milk product 4.7.1 Storage conditions 4.7.2 Storage principles; FIFO 4.7.3 Storage equipment 4.8 Apply Smart and Sustainable Systems 4.8.1 AI application 4.8.2 Sustainable packaging options 4.8.3 Sustainable waste disposal	

Suggested Methods of Instruction

- Practical
- Demonstrations
- Group discussion
- Direct instruction
- Role playing

Recommended Resources for 25 Trainees Tools and Equipment

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.	Stabilizers		1ltr	1:5
2.	Emulsifier		10mls	10:5
3.	Sweeteners		1	1;5
4.	Cream		-	-
5.	Butter		1ltr	1:5
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	5:25
6.	Pasteurizer		1 pcs	1:25
7.	Homogenizer		1 pcs	1:25
8.	Lovi bond Comparator		1pcs	1:25
9.	Ageing tank		1pcs	1:25
10.	Ice Cream Freezer		1pcs	1:25