CONCENTRATED AND DRIED MILK PRODUCTS PROCESSING

UNIT CODE: 0721 551 17A

TVET CDACC UNIT CODE: DA/CU/PM/CR/01/6/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Process Concentrated and Dried Milk Products

Duration: 160 Hours

Unit Description

This unit specifies the competencies required to process concentrated and dried milk products. It involves production of condensed, evaporated and dried 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.	Process condensed milk products	50
2.	Process evaporated milk	40
3.	Process dried Milk	70
4.	Process condensed milk products	50
Total		**120**

Learning Outcomes	Content	Suggested Assessment Methods
1. Process condensed milk products	1.1 Condensed Milk concepts 1.1.1 Definition of condensation 1.1.2 Types of condensed milk products	• Practical assessment. • Project • Portfolio of evidence. • Third party report. • Written tests.

	1.1.2.1 sweetened 1.1.2.2 unsweetened 1.1.3 Importance of condensation 1.1.4 Principles of evaporation 1.1.5 Principles of membrane technology 1.1.6 Freeze drying techniques 1.1.7 Good manufacturing practices 1.1.8 Good laboratory practices 1.2 Raw milk Sampling 1.2.1 Definition of terms 1.2.1.1 Sample 1.2.1.2 Sampling 1.2.1.3 Population 1.2.2 Sampling methods 1.2.3 Sampling procedures 1.3 Raw milk quality Analysis 1.3.1 Raw milk quality tests 1.3.2 Organoleptic 1.3.3 Clot On Boiling 1.3.4 Compositional test 1.3.5 Resazurin test 1.3.6 Alcohol test 1.3.7 Lactometer test 1.3.8 Antibiotic test 1.3.9 pH test 1.4 Condensed milk equipment and materials	• Oral questioning

	1.4.1 Materials 1.4.1.1 Raw milk 1.4.1.2 Sugar 1.4.1.3 Packaging material - Biodegradable and ecofriendly options 1.4.2 equipment 1.4.2.1 Stainless steel vessel 1.4.2.2 Evaporator 1.4.2.3 Heat source 1.4.2.4 Mixer 1.4.2.5 Condenser 1.4.2.6 Packaging equipment 1.4.3 Application of A.I 1.5 Milk standardization 1.5.1 Definition 1.5.2 Determination of milk composition 1.4.2.1 Gerber fat test 1.5.3 Standardization methods 1.5.3.1 Pearson's square method 1.5.4 Importance of standardization 1.6 Condensation process 1.6.1 Concepts of condensation 1.6.2 Heat treatment 1.6.3 Evaporation 1.6.4 Homogenization 1.6.5 Cooling 1.6.6 Alternative processing	

	1.6.6.1 sterilization 1.6.6.2 canning 1.7 Evaluation of quality 1.7.1 Bulk density 1.7.2 Solubility index 1.7.3 Yeast and molds 1.7.4 Sensory evaluation 1.7.5 Moisture content 1.8 Packaging of condensed milk 1.8.1 Definition of packaging 1.8.2 Packaging machines 1.8.3 Packaging materials 1.8.4 Aseptic packaging 1.8.5 Eco friendly and biodegradable packaging 1.8.6 Importance of Packaging 1.9 Storage of condensed milk 1.9.1 Definition of terms 1.9.2 Storage conditions 1.9.3 Storage principles; FIFO 1.9.4 Storage equipment 1.10 Hygiene and sanitation of pasteurization equipment 1.10.1 Cleaning procedures 1.10.2 Sanitization methods 1.11 Waste disposal 1.11.1 Sustainable Methods of waste disposal 1.11.2 Importance of waste disposal	

	1.12 Record-keeping 1.12.1 Types of records 1.12.2 Importance of Record keeping 1.12.3 Cloud storage of data	
2. Process evaporated milk	2.1 Evaporated Milk Processing 2.1.1 Definition of terms 2.1.1.1 Evaporation 2.2 Raw milk Sampling 2.2.1 Definition of terms 2.2.1.1 Sample 2.2.1.2 Sampling 2.2.1.3 Population 2.2.2 Sampling methods 2.2.3 Sampling procedures 2.3 Raw milk quality Analysis 2.3.1 Raw milk quality tests 2.3.2 Organoleptic 2.3.3 Clot On Boiling 2.3.4 Compositional test 2.3.5 Resazurin test 2.3.6 Alcohol test 2.3.7 Lactometer test 2.3.8 Antibiotic test 2.3.9 pH test 2.4 Evaporated Milk processing equipment and materials 2.4.1 Sterilization Materials	• Practical assessment. • Portfolio of evidence. • Third party report. • Written tests. • Oral questioning

	2.4.1.1 Pasteurized milk 2.4.1.2 Packaging material 2.4.2 Sterilization Equipment 2.4.2.1 Evaporator 2.4.2.2 Homogenizer 2.4.2.3 Retort 2.4.2.4 Canning line 2.4.2.5 Packaging equipment 2.4.3 Application of A.I 2.5 Milk standardization 2.5.1 Definition of Milk Standardization 2.5.2 Determination of milk composition 1.4.2.1 Gerber fat test 2.5.3 Standardization methods 2.5.3.1 Pearson's square method 2.5.4 Importance of standardization 2.6 Evaporation process 2.6.1 Evaporation 2.6.2 Homogenization 2.6.3 Canning 2.6.4 Sterilization 2.7 Quality evaluation 2.7.1 Bulk density 2.7.2 Solubility index 2.7.3 Yeast and molds 2.7.4 Sensory evaluation	

	2.7.5 Moisture content 2.8 Packaging of evaporated milk products 2.8.1 Definition of terms 2.8.2 Packaging machines 2.8.3 Packaging materials 2.8.4 Eco-friendly and biodegradable packaging options 2.8.5 Importance of Packaging 2.9 Storage of UHT milk 2.9.1 Definition of terms 2.9.2 Storage conditions 2.9.3 Storage principles; FIFO 2.9.4 Storage equipment 2.10 Hygiene and sanitation of UHT processing equipment 2.10.1 Cleaning procedures 2.10.2 Sanitization methods 2.11 Waste disposal 2.11.1 Methods of waste disposal 2.11.2 Importance of waste disposal 2.12 Record keeping 2.12.1 Types of records 2.12.2 Importance	
3.Process dried milk	3.1 Processing of extended shelf-life milk 3.1.1 Definition of terms 3.1.1.1 Shelf life 3.1.1.2 Extended shelf life	• Practical assessment. • Portfolio of evidence. • Third party report. • Written tests. • Oral questioning

	3.2 Raw milk Sampling 3.2.1 Definition of terms 3.2.1.1 Sample 3.2.1.2 Sampling 3.2.1.3 Population 3.2.2 Sampling methods 3.2.3 Sampling procedures 3.3 Raw milk quality Analysis 3.3.1 Raw milk quality tests 3.3.2 Organoleptic 3.3.3 Clot On Boiling 3.3.4 Compositional test 3.3.5 Resazurin test 3.3.6 Alcohol test 3.3.7 Lactometer test 3.3.8 Antibiotic test 3.3.9 pH test 3.4 Extended shelf-life milk processing equipment and materials 3.4.1 Materials 3.4.1.1 Pasteurized milk 3.4.1.2 Packaging material 3.4.2 Equipment 3.4.2.1 Pasteuriser 3.4.2.2 Cream separator 3.4.2.3 Evaporator 3.4.2.4 Homogenizer 3.4.2.5 Drier	

	3.4.3 Use of A.I 3.4.3.1 Machine learning 3.4.3.2 Use of robotics 3.5 Milk standardization 3.5.1 Definition of Milk Standardization 3.5.2 Determination of milk composition 1.4.2.1 Gerberfat test 3.5.3 Standardization methods 3.5.3.1 Pearson's square method 3.5.3.2 Importance of standardization 3.6 Drying process 3.6.1 3.7 Quality Evaluation 3.7.1 Colour 3.7.2 Consistency 3.7.3 Taste 3.7.4 Flavour 3.8 Packaging of dried milk products 3.8.1 Definition of packaging 3.8.2 Packaging machines 3.8.3 Packaging materials 3.8.4 Bio degradable packaging options 3.8.5 Importance of Packaging 3.9 Storage of dried milk products 3.9.1 Storage conditions	

	3.9.2 Storage principles; FIFO 3.9.3 Storage equipment 3.10 Hygiene and sanitation of dairy equipment's 3.10.1 Cleaning procedures 3.10.2 Sanitization methods 3.11 Waste disposal 3.11.1 Methods of waste disposal 3.11.2 Importance of waste disposal 3.12 Record keeping 3.12.1 Types of records 3.12.2 Importance Record -keeping	

Suggested Methods of Instruction

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

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**			
5	Lecture/theory room		1	1:25
6	Workshop		1	1:25
7	Laboratory		1	1:25
8	Site/industry		1	1:25
C	**Consumable materials**			
7.	Raw milk		1ltr	1:5
8.	Sugar		1	1;5
9.	Skimmed milk powder		500ml	500mls:5
D	**Tools and Equipment**			
10.	Alcohol gun		5 pcs	1:5
11.	Lactometer		5pcs	1;5
12.	Thermometer		1 pcs	1:5
13.	Centrifuge		5 pcs	1:25
14.	Clarifier		5pcs	5:5
15.	Lovi bond Comparator		1 pcs	1:25
16.	Refrigerator/cold room		1 pcs	1:25
17.	Stop watch		5pcs	1:5