



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

FOPFM303

FERMENTED MILK PRODUCTION

PRODUCE FERMENTED MILK

Competence

RQF Level: 3

Learning Hours



50

Credits: 5

Sector: Agriculture and Food Processing

Trade: Food Processing

Module Type: Specific

Curriculum: AGRFOP3003- TVET Certificate 3 Food Processing

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ISSUED DATE September, 2022

Purpose statement	This module describes the skills, knowledge and attitude required to perform yogurt and IKIVUGUTO making in dairy industry. Upon completion of this module the learners will be able to prepare workplace, ferment the milk and store fermented milk products.						
	At the end of this module the learner will be able to produce fermented milk products such as yogurt and IKIVUGUTO under regular and direct supervision.						
Delivery modality	Training delivery			100%	Assessment		Total 100%
	Theoretical content			30%	Formative assessment	30%	50%
	Practical work:			70%		70%	
	• Group project and presentation	20%					
	• Individual project /Work	50%					
				Summative Assessment			50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Prepare workplace	1.1. Tools and equipment are properly selected according to intended use
	1.2. Work area is properly arranged according to production process
	1.3. Ingredients are well prepared according to product specification
2. Ferment the milk	2.1. Pasteurised milk is properly tested according to product specification
	2.2. Pasteurised milk is properly cooled according to product specification
	2.3. Pasteurised milk is adequately incubated according to product specification
3. Store fermented milk	3.1. Packaging materials are properly prepared according to their types
	3.2. Fermented milk is accurately packaged according to the product requirement
	3.3. Storage parameters are properly monitored according to products storage conditions.

Learning outcomes	At the end of the module the learner will be able to: 1. Prepare workplace 2. Ferment the milk 3. Store fermented milk
Learning outcome 1: Prepare workplace	Learning hours: 5
Indicative content	
• Selection of materials, tools and equipment ✓ Identification of materials, tools and equipment - Ingredients for making fermented milk - Cleaning products used in fermented milk preparation - Tools and equipment for workplace cleaning - Tools and equipment for fermented milk making ✓ Adjustment and functionality of tools and equipment • Arrangement of workplace ✓ Cleaning of workplace - Cleaning methods and techniques for tools and equipment - Cleaning methods for workplace ✓ Purposes of work area arrangement ✓ Working area layout(production process). • Preparation of ingredients for fermented milk ✓ Perform ingredients calculation and weighing - Ingredients for IKIVUGUTO - Ingredients for yogurt	
Resources required for the learning outcome	
Equipment	Milk cooling tanks, pasteurizers, incubator, milk cans, black board, projector, computer, tables, refrigerator, freezer, incubation vats, PPEs, packaging machine, sealing machine, labelling machine, pressure cleaners, gas cookers,
Materials	Raw milk, mesophilic and thermophilic starter cultures, sugar, flavours, stabilizers, sodium hydroxide, liquid soaps, solid soaps, chalks, papers, alcohol, gloves, labels, disinfectants, water, gas, packaging materials, flip chart, mark pen, aluminium foil, scotch, glue, fire extinguisher, First aid kit.
Tools	Thermometer, pH meter, stirrer, sauce pans, buckets, spoons, electronic balance, mechanical balance, beakers, brushes, mops, squeegees, towels, filters sweeper, basin,

	waste bins.
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion • brainstorming
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment

Learning outcome 2: Ferment the milk	Learning hours: 40
Indicative content	
• Pasteurize the milk ✓ Addition of ingredients to the milk + Types of yoghurt ingredients + Uses of ingredients ✓ Performing standardization of milk + Purposes of milk standardization + Milk standardization techniques ✓ Performing homogenization of milk + Purpose of milk homogenization + Homogenization conditions ✓ Check the effectiveness of pasteurization + Time and Temperature + Alkaline phosphatase test + Organoleptic test • Milk cooling according to the product specification ✓ cooling milk for IKIVUGUTO making + Inoculation temperature + Addition of starter culture ✓ Cooling of milk for yoghurt making	

-  Inoculation temperature
-  Addition of starter culture

- **Incubation of inoculated milk**

- ✓ Application of incubation conditions for IKIVUGUTO
 -  Temperature
 -  Time
- ✓ monitoring incubation conditions for yogurt
 -  Temperature
 -  Time
- ✓ Checking the quality of fermented milk
 -  Quality parameters of Ikivuguto
 -  Yoghurt quality parameters

Resources required for the indicative content

Equipment	Milk cooling tanks, pasteurizers, incubator, milk cans, black board, projector, computer, tables, , incubation vats, PPEs,
Materials	Raw milk, mesophilic and thermophilic starter cultures, sugar, flavours, stabilizers, , papers, gloves, , water, gas, flip chart ,mark pen, chalks.
Tools	Thermometer, pH meter, stirrer, sauce pans, buckets, spoons, electronic balance, mechanical balance, beakers, filters
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion • Brainstorming • Field visit
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment • Product based assessment

Learning outcome 3: Store fermented milk		Learning hours: 5	
Indicative content			
● Preparation of packaging materials ✓ Identifying of different types of packaging materials ✚ Packaging materials for IKIVUGUTO ✚ Packaging materials for yogurt ● Packaging of fermented milk products ✓ Perform packaging of fermented milk products ✚ Filling milk product in packaging material ✚ Sealing the container which contains the milk product ✓ Perform labelling the milk products ✚ Types of labelling ✚ Providing labelling information ● Monitoring of storage conditions of fermented milk ✓ Performing of storage techniques of fermented milk ✓ Application of storage conditions of fermented milk products			
Resources required for the indicative content			
Equipment		milk cans, black board, projector, computer, refrigerator, freezer, PPEs, packaging machine, sealing machine, labelling machine, Homogenizers, incubator,	
Materials		chalks, papers, gloves, labels, packaging materials, flip chart, mark pen, aluminium foil, scotch, glue,	
Tools		Thermometer, timer, stirrer, wooden spoon, cooking pan, electronic and mechanical balance, jags,	
Facilitation techniques		● Demonstration ● Individual and group work ● Practical exercise ● Individualized ● Trainer guided ● Group discussion	
Formative assessment methods		● Written assessment ● Oral presentation ● Performance assessment ● Product based assessment	

Integrated assessment

Integrated situation

LAVIBOND super market which is located in Gasabo district, needs fermented milk products to sell on trade exhibition day. The supermarket has been produced fermented milk with low quality, therefore, the supermarket manager hired you as assistant technician skilled in fermented milk production to improve the quality of products by making samples of 5 cups of plain set yogurt, 5 cups of flavored stirred yogurt and 5 cups of IKIVUGUTO within 5 hours.

Note:

- All activities should be done at super market production unity
- All materials, tools and equipment are provided in supermarket production unity

Instructions:

- The cups to be used should be of 250 ml each product,
- The Flavours (in flavoured yoghurt) should be straw berry in 5 cups
- The pH of the products should range between 4 and 4.6

Tools	Thermometer, pH meter, stirrer, sauce pans, buckets, spoons, electronic balance, mechanical balance, beakers, brushes, mopes, squeegees, towels, filters, sweeper, basin
Equipment	Milk cooling tanks, pasteurizers, incubator, milk cans, tables, refrigerator, freezer, incubation vats, PPEs, packaging machine, sealing machine, labelling machine, pressure cleaners, gas cookers
Materials/ Consumables	Raw milk, mesophilic and thermophilic starter cultures, sugar, flavors, stabilizers, sodium hydroxide, liquid soaps, solid soaps, alcohol, gloves, labels, disinfectants, water, gas, packaging materials, aluminums foil, scotch, glue.

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: Prepare workplace (30%)	1.1. Tools and equipment are properly selected according to intended use	Ind.1. Cleaning products are selected			3
		Ind.2. Cleaning tools and equipment are selected			2
		Ind.3. Processing tools and equipment are selected			3

		Ind.4. Storage tools and equipment are selected			3
	1.2. Work area is properly arranged according to production process	Ind.1. Tools and equipment are cleaned			5
		Ind.2. Work area is cleaned			4
		Ind.3. Work area is set			3
	1.3. Ingredients are well prepared according to product specification	Ind.1. Ingredients for IKIVUGUTO are selected			2
		Ind.2. Ingredients for yogurt are selected			2
		Ind.3. Straw berry flavor for yoghurt used			3
Learning outcome 2: Ferment the milk (40%)	2.1. Milk is properly pasteurized according to product specification	Ind.1. Milk standardization is done			3
		Ind.2. Homogenization is done			3
		Ind.3. Pasteurization temperature is respected			2
		Ind.4. Pasteurization holding time is respected			2
		Ind.5. Alkaline phosphatase test is performed.			2
		Ind.6. Organoleptic test is performed.			3
	2.2. Milk is properly cooled according to product specification	Ind.1. Inoculation temperature for IKIVUGUTO is respected			2
		Ind.2. Addition of IKIVUGUTO starter culture is done			2
		Ind.3. Inoculation temperature for yoghurt is respected			3
		Ind.4. Addition of yoghurt starter culture			2

		is done			
		Ind.5. PH of yoghurt is achieved			4
	2.3. Milk is well incubated according to product specification	Ind.1. Incubation temperature for IKIVUGUTO is respected			3
		Ind.2. Incubation time for IKIVUGUTO is respected.			3
		Ind.3. Incubation temperature for yoghurt is respected.			3
		Ind.4. Incubation time for yoghurt is respected.			3
Learning outcome 3: Store fermented milk (30%)	3.4. Packaging materials are properly prepared according to their types	Ind.1.Packaging materials for IKIVUGUTO are used.			3
		Ind.2.Packaging materials for yoghurt are used.			3
		Ind.3. pH of product is achieved.			5
	3.2. Fermented milk is accurately packaged according to the product requirement	Ind.1. Filling of fermented milk is done.			4
		Ind.2. Sealing is done.			4
		Ind.3. Labelling is done.			3
	3.3. Storage parameters are properly monitored according to products storage conditions	Ind.1. Storage technique is done.			5
		Ind.2. Storage conditions are respected.			3
	Total marks		100		
Percentage Weightage		/100%			
Minimum Passing line % (Aggregate): 70%					

References:

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9. Watts, S. (2016). A mini review on technique of milk pasteurization. *Journal of Pharmacognosy and Phytochemistry*, 5(5), 99.