

FOPNS303

NECTAR AND SQUASH PRODUCTION

PROCESS FRUITS INTO NECTAR AND SQUASH

Competence

RQF Level: 3

Learning Hours



60

Credits: 6

Sector: Agriculture and Food Processing

Trade: Food Processing

Module Type: Specific

Curriculum: AGRFOP3003- TVET Certificate 3 Food Processing

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Issue Date: June 2022

Purpose statement	This competence covers the skills, knowledge and attitude required to process fruits into Nectar and Squash in the food processing industry. Upon completion of this module, trainee will be able to prepare work place, Make and Store Nectar and Squash. He is expected to perform these tasks respecting food quality and safety standards under regular and directive 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%					
				Integrated Assessment		50%	

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Prepare workplace and Materials	1.1. Materials , tools and equipment are well selected according to intended use
	1.2. Work area is properly arranged according to production process
	1.3. Ingredients are adequately prepared according to product specification
2. Make nectar and squash	2.1. Juice is effectively extracted according to the fruits types
	2.2. Brix is well adjusted according to product specification
	2.3. Juice is effectively pasteurized according to product specification
	2.4. Nectar and squash are well cooled according to product specification
3. Store nectar and squash	3.1. Packaging material is well selected according to product specification

	3.2. Nectar and Squash juices are well packaged according the packaging requirements
	3.3. Nectar and Squash are well kept according to the storage condition

Learning outcomes	At the end of the module the learner will be able to:
	1. Prepare workplace 2. Make nectar and squash 3. Store nectar and squash
Learning outcome 1: Prepare workplace	Learning hours: 15
Indicative content	
• Selection of materials, tools and equipment used in nectar and squash ✓ Description of tools and equipment used in nectar and squash ✚ List and use of tools and equipment ✚ Selection criteria of tools and equipment ✚ Functionality and adjustment of tools and equipment ✓ Safety precautions of the tools and equipment (effect on the user and product) ✓ Identification of cleaning agent ✚ Types of cleaning agent ✚ Direction of use of cleaning agent ✓ Safety and health precaution of cleaning product ✓ Identification of materials used in nectar and squash ✚ List of ingredients used in nectar and squash ✚ Selection criteria of ingredients used in nectar and squash ✚ Checking the quality of ingredients	

- ✓ Handling of received fresh fruits to be processed
 - + Application storage techniques
 - + Describe the factors affecting postharvest storability of fresh fruits
 - + Monitoring storage conditions of fresh fruits

- **Cleaning of workplace**

- ✓ Purpose of cleaning workplace
- ✓ Factors affecting cleaning effectiveness
- ✓ Application of cleaning methods
 - + Wet method
 - + Dry method
- ✓ Application of cleaning techniques
 - + Cleaning in place (CIP)
 - + Cleaning out of place (COP)

- **Arrangement of work area**

- ✓ Purpose of arranging work area
- ✓ Setting work area (flow chart)

- **Preparation of Ingredients**

- ✓ Sorting and grading of fruits
 - + Performing Sorting and Grading
- ✓ Washing the fruits
 - + Purpose of washing fruits
 - + Application of washing procedures of fruits
 - + Application of washing disinfectants
- ✓ Peeling and cutting the fruits.

Resources required for the learning outcome

Equipment	Pulping machine, pasteurizer, washing machine, slicing machine, peeling machine, cooling tank, boiling pans, packaging machine, blender, cutting table, PPE, projector, Computer, Fire extinguisher, colloidal mill, compressor, Generator, Fridge, cooker
Materials	Fruits, sugar, water, Preservatives, disinfectants, chalks, pens, packaging materials, labels,
Tools	knives, spoons, refractometer, thermometer, Fruits sizer ring, jugs, Analytical balances, Cutting boards, Filter cloths, sponges, boards, Brushes, broom, Dustbin. UV Lamp, pest killer, mops, bucket, dustbin
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion • Brainstorming • Audio-visual
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment

Indicative content

- **Extraction of fruits juice**
 - ✓ Application of crushing and scooping of the fruits
 - ✓ Application of juice extraction method depending on the types of fruits.
 - ✓ Performing filtration and clarification of juice
- **Adjustment of brix in juice**
 - ✓ Determination of ratio of juice/water/sugar
 - ✚ Measuring of crude juice brix
 - ✚ Calculation of sugar and water added
 - ✓ Mixing ingredients
- **Pasteurization of juice**
 - ✓ Application pasteurization methods of juice
 - ✚ high temperature Short time (HTST)
 - ✚ Low temperature long time (LTLT)
- **Addition of nectar and squash preservatives**
 - ✓ Determination of preservatives ratio
 - ✚ Preservation conditions

Resources required for the indicative content

Equipment	Pulping machine, slicing machine, pressing /squeezing machine, Storage tank, pasteurizers, juice mixer, Blender, crushing machine, juicer, PPE, projector, Computer, fire extinguisher, Generator, cooker
Materials	Fruits, Sugars, preservatives, water, Cleaning detergents, chalks, pens, Books

Tools	Basins, Bucket, refractometer, jugs, Analytical balance, Filter cloths, sponges, boards, Thermometer, Clocks, brushes, Brooms, Boiling pans, dust bin, pH-meter,
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion • Brainstorming • Audio-visual
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment • Product based assessment

Learning outcome 3: Store nectar and squash	Learning hours: 10
Indicative content	
• Cooling of Nectar and Squash ✓ Application of cooling methods • Checking the quality of Nectar and Squash ✓ Testing of organoleptic parameters  Color  Taste  Flavour  Clarity ✓ Testing chemical parameter  Total soluble solids content (Brix)  Acidity (pH) • Selection of packaging materials ✓ Description of packaging material types for nectar and squash ✓ Description of labelling requirements for nectar and squash	

- **Packaging of nectar and squash**

- ✓ Description of packaging
 - ✚ Purpose of packaging
 - ✚ types of packaging
 - ✚ Types of packaging materials
- ✓ Monitoring storage conditions for nectar and squash
- ✓ Application of food storage guidelines

Resources required for the indicative content

Equipment	Packaging machine, washing machine, cooling tank, packing tables, Sealing machine, Fire extinguisher, Compressor, Generator, PPE
Materials	juices, water, Cleaning detergents, Chalks, Pens, Packaging materials, Labels, Cartons
Tools	Basin, Bucket, Jugs, Analytical balance, Sponges, Projector, boards, , Computer, Pallets, Dustbin, Glue
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment

Integrated/Summative assessment (For specific module)

Integrated situation

Rusizi district located at western province produces a big quantity of fruits, the farmers grouped in **IFASHE MUBYEYI URASHOBOYE** cooperative have the factory which process the passion fruits into Squash and Nectar for minimizing post-harvest losses and adding value of their produces. Unfortunately, the juices produced were not meeting with nectar and squash juice specification in term of Brix content. A President of the cooperative hired you as an assistant technician of this processing factory to find a solution of this problem.

Tasks:

- To make sample of nectar juice of 1l with 14°Brix
- To make sample of squash juice of 500ml with 40°Brix

Instructions:

- The bottles to be used should be of 500ml for nectar and 500ml for squash
- The duration for the activities is 5hours

Resources

Tools	Calculator, knives, spoons, refractometer, thermometer, Fruits sizer ring, jugs, Analytical balance, Cutting boards, Filter cloths, sponges, PPE, Brushes, broom, pH meter, Pallet
Equipment	Pulping machine, pasteurizer, washing machine, slicing machine, peeling machine, cooling tank, boiling pans, packaging machine, blender, cutting table, sealing machine, Fridge
Materials/ Consumables	Fruits, sugar, water, Preservatives, cleaning detergents, packaging materials, pens, papers, Labels

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
1. Prepare workplace and Materials (30%)	1.1. Tools, materials and equipment are well selected according to intended use	Ind.1. Tools and equipment are selected			1
		Ind.2. materials are selected			2
		Ind.3. Tools and equipment are adjusted			1
		Ind.4. Cleaning agent is identified			2
		Ind.5. Cleaning agent is used			1
		Ind.6. Ingredients are selected			1
		Ind.7. Quality is checked			1
		Ind.8. Storage technique is applied			2
		Ind.9. storage factors are controlled			2
		Ind.10. Storage conditions are monitored			2
	1.2. Work area is properly arranged according to product specification	Ind.1. Cleaning techniques are applied			2
		Ind.2. Cleaning methods are applied			2
		Ind.3. Cleaning factors are controlled			2
		Ind.4. Work area is set			2
	1.3. Ingredients are adequately prepared according to product specification	Ind.1. Sorting is done			2
		Ind.2. Grading is done			2
		Ind.3. Disinfectants are used			2
		Ind.4. Washing fruits is performed			1

2. Make nectar and squash (40%)	2.1. Juice is effectively extracted according to the fruits types	Ind.1. Cutting is performed			4
		Ind.2. Scooping is performed			3
		Ind.3. Pulping is performed			3
		Ind.4. Filtration is done			3
		Ind.5. Clarification is done			3
	2.2. Brix is well adjusted according to product specification	Ind.1. Brix of crude juice are measured			4
		Ind.2. Sugar and water added are calculated			4
		Ind.3. Ingredients are mixed			4
	2.3. Juice is effectively pasteurized according to product specification	Ind.1. High Temperature Short time is used			4
		Ind.2. Temperature is controlled			4
		Ind.3. Time is respected			4
3. Store nectar and squash (30%)	3.1. Nectar and squash are well cooled according to protocol	Ind.1. Cooling conditions are monitored			2
		Ind.2. Preservatives of nectar and squash are identified			2
		Ind.3. Preservation ratios are respected			2
		Ind.4. Preservation conditions are monitored			2
		Ind.5. Color is checked			2

		Ind.6. Flavor is tasted			2
		Ind.7. pH Test are done			2
		Ind.8. Total solids content is measured			2
	3.2. Packaging material is well selected according to product specification	Ind.1. Packaging materials are Selected			2
		Ind.2. Labelling requirements are described			3
	3.3. Nectar and Squash juices are well packaged according the packaging requirements	Ind.1. Packaging techniques are applied			3
		Ind.2. Labelling techniques are applied			3
		Ind.3. Storage conditions are monitored			3
	Total marks		100		
Percentage Weightage		100%			
Minimum Passing line % (Aggregate): 70%					

References

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2. Hui, Y.H (2008). Handbook of fruits processing. John Wiley & Sons. Second Edition 2012
3. Dr. Peter Fellow, UNJDO Consultant, in cooperation with the project team UNIDO. Small scale fruits and vegetables processing and products. Vienna 2004
4. Sara Beth Dadson, Graduate student, Food Science and Technology, Safe Handling of storing of raw fruits and vegetables. Virginia Tech 2016

