



RQF LEVEL 5



FOPPA503

FOOD PROCESSING

Pasta Making

TRAINER'S MANUAL

October, 2024



PASTA MAKING



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ACRONYMS

%: Percent

°C: Degree Celsius

Nº: Number

ATP: Adenosine Triphosphate

CFU: Colony Forming Units

CIP: Clean In Place

COP: Clean Out Place

CBT/A: Competency Based Training/Assessment

FOP: Food Processing

FOPPA503: Food Processing, Pasta Making Level 5, Version 3

KOICA: Korea International Cooperation Agency

MAP: Modified Atmosphere Packaging

PE: Polyethylene

PH: potential Hydrogen

PP: Polypropylene

PPE: Personal Protective Equipment

PVC: Polyvinyl Chloride

RTB: Rwanda TVET Board

SOPs: Standard Operating Procedures

TQUM Project: TVET Quality Management Project

TVET: Technical and Vocational Education and Training

INTRODUCTION

This trainer's manual includes all the methodologies required to effectively deliver the module titled "**Pasta Making**." Trainees enrolled in this module will engage in practical activities designed to develop and enhance their competencies.

The development of this training manual followed the Competency-Based Training and Assessment (CBT/A) approach, offering ample practical opportunities that mirror real-life situations.

The trainer's manual is organized into Learning Outcomes, which is broken down into indicative content that includes both theoretical and practical activities. It provides detailed information on the key competencies required for each learning outcome, along with the objectives to be achieved.

As a trainer, you will begin by asking questions related to the activities to encourage critical thinking and guide trainees toward real-world applications in the labour market. The manual also outlines essential information such as learning hours, didactic materials, and suggested methodologies.

This manual outlines the procedures and methodologies for guiding trainees through various activities as detailed in their respective trainee manuals. The activities included in this training manual are designed to offer trainees opportunities for both individual and group work. Upon completing all activities, you will assist trainees in conducting a formative assessment known as the end learning outcome assessment. Ensure that Trainees review the key reading and the points to remember section.

MODULE CODE AND TITLE: FOPPA503 PASTA MAKING

Learning Outcome 1: Prepare Workplace and Ingredients

Learning Outcome 2: Make Fresh Pasta

Learning Outcome 3: Preserve Pasta

Learning Outcome 1: Prepare Workplace and Ingredients



Indicative contents

- 1.1. Selecting Tools and Equipment for Pasta Making**
- 1.2. Selecting Cleaning Agents used in Pasta Making**
- 1.3. Selecting Ingredients used in Pasta Making**
- 1.4. Selecting Pasta Packaging Materials**
- 1.5. Arranging Workplace for Pasta Making**
- 1.6. Preparing the Ingredients for Pasta Making**

Key Competencies For Learning Outcome 1 : Prepare Workplace and Ingredients

Knowledge	Skills	Attitudes
● Description of tools and equipment used in pasta making. ● Description of cleaning agents used in pasta making ● Description of ingredient used in pasta making ● Description of pasta packaging materials	● Selecting and adjusting of tools and equipment used in pasta making ● Selecting cleaning agent used in pasta making ● Selecting ingredients used in pasta making ● Selecting the paste Packaging materials ● Cleaning the workplace, tools and equipment ● Checking cleanliness of workplace, tools and equipment ● Preparing the ingredients used in pasta making	● Being committed while selecting tools, equipment and materials ● Being careful when using cleaning agent ● Being accountable while weighing ingredient ● Being carefully while checking workplace cleanliness ● Being vigilant while checking the quality of ingredient



Duration: 15hrs

Learning outcome 1 objectives:



By the end of the learning outcome, the trainees will be able to:

1. Describe correctly the tools and equipment used in pasta making according to their intended use.
2. Select properly the tools and equipment for pasta making according to the intended use.
3. Describe clearly the cleaning agent based on their types
4. Select properly the cleaning agents based on their types
5. Describe properly ingredients used in pasta making based on their intended use.
6. Select properly ingredients used in pasta making based on the selection criteria.
7. Describe properly the pasta packaging materials based on the types
8. Select properly the paste packaging materials based on the types
9. Clean effectively the workplace, tools and equipment for pasta making
10. Check effectively cleanliness of workplace according to checking methods
11. Prepare properly the ingredients used in pasta making



Resources

Equipment	Tools	Materials
● High pressure washer machine ● Working table ● Sifting machine ● weighing balances ● dough mixer ● pasta machine (Extruder) ● oven dryer ● drying rack ● cooler ● packaging machine ● PPE.	● Cleaning tools ● weighing tools ● knives ● sieves ● Ravioli cutters ● gnocchi boards ● spaghetti rollers ● rolling pin cutters ● waste bin	● Cleaning agent ● wheat flour ● Eggs ● salt ● sugar ● oil ● spices ● packaging materials ● water



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail materials, tools and equipment used in pasta making and make sure that they are in good working condition, and verify if materials are not expired
- Avail didactic materials used for pasta making like:(manuals/guides, task sheets, photos, audio-visuals, protocols)
- Make sure that both classroom and workshop are available
- Avail semolina wheat flour.



Indicative Content 1.1: Selecting Tools and Equipment for Pasta Making



Duration: 3hrs



Theoretical Activity 1.1.1: Description of tools and equipment used in pasta making



Notes to the trainer:

- Trainer may form a small group to describe the tools and equipment based on intended to use.
- The use pictures, videos as didactic materials while describing tools and equipment used in pasta making is required.
- Avail tools and equipment used in pasta making.



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the session and ask trainees to answer the following questions:
- i. What do you understand by pasta product?
 - ii. What could be the tools and equipment used in pasta making?
 - iii. What do you know about Safety precautions of tools and equipment used in pasta making?
- Step2** Ask trainees to write the findings on papers, flip chart, blackboard or white boards
- Step3** Facilitate trainees to present their findings
- Step4** Provide expert view and clarify ideas using didactic materials
- Step5** Address any questions or concerns
- Step6** Ask trainees to read the **key reading 1.1.1** in trainee manual



Points to Remember

- While making the pasta product you must have extruder machine.
- Before making pasta, make sure that all ingredient is available and respect safety precaution of using tools and equipment.



Practical Activity 1.1.2: Selecting and adjusting tools and equipment



Notes to the trainer

- The trainer may demonstrate how to select and adjust tools and equipment based on the intended use.
- The trainer is recommended to:
 - ✓ Avail catalogue, images and illustrations as didactic material used for pasta making
 - ✓ Avail tools and equipment used in pasta making



Key steps:

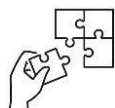
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to go to the pasta making workshop, to select and adjust tools and equipment.
- Step2** Explain the task and provide clear work instructions (PPE, Time allocated)
- Step3** Demonstrate how to select and adjust tools and equipment. While demonstrating, the adjustment procedure.
- Step4** Ask trainees to select and adjust tools and equipment used in pasta making and monitor the procedures.
- Step5** Verify whether the tools and equipment is correctly selected, adjusted and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.1.2 in the trainee manual.
- Step7** Ask trainees to perform the task provided in the application of Learning 1.1



Points to Remember

- While making the pasta product you must have extruder machine.
- Before making pasta, make sure that all ingredient is available and respect safety precaution of using tools and equipment.
- Safety precaution of using tools and equipment must be followed
- Before making pasta product, make sure that tools and equipment are safe and in good working condition



Application of learning 1.1.

Ask trainees to go in pasta making workshop to select and adjust tools and equipment used in pasta making.

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1	Tools and equipment are properly selected and adjusted	1.1.Selection criteria are considered		
		1.2.Selecting steps are respected		
		1.3.Adjustment steps are respected		



Indicative Content 1.2: Selecting Cleaning Agents Used in Pasta Making



Duration: 2hrs



Theoretical Activity 1.2.1: Description of cleaning products used in cleaning the workplace, tools and equipment



Notes to the trainer:

- Trainer may use small groups to describe the cleaning products
- The use of image or videos as didactic materials is required



Key steps:

While delivering this activity, pass through the following steps:

Step1 Introduce the activity and ask trainees to answer the following questions:

- i. Suggest cleaning products that should be used in cleaning the workplace?
- ii. What do you know about safety precautions of cleaning products to user?
- iii. Suggest the direction for use of cleaning products while you are cleaning the workplace?

Step2 Ask trainees to write their findings on papers, flip chart.

Step3 Asks trainees to discuss on the provided answers and choose the correct ones.

Step4 Provide the expert view and clarify ideas by using didactic materials.

Step5 Address any questions or concerns.

Step6 Ask trainees to read the key readings 1.2.1 in trainee manual



Points to Remember

- The cleaning products should be in form of liquid, powder and solid
- You are recommended to read and understand careful the guide lines of using cleaning product which is written on label before using it.
- Wear properly PPEs while you are using cleaning products



Practical Activity 1.2.2: Selecting cleaning products



Notes to the trainer

- The trainer may demonstrate how to select cleaning products used in pasta making.
- Avail cleaning product to be selected



Key steps:

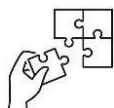
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to select cleaning products used in pasta making.
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to select cleaning products used in pasta making.
While demonstrating, explain the steps.
- Step4** Ask trainees to select cleaning products used in pasta making and monitor the procedures.
- Step5** Verify whether cleaning products used in pasta making are well selected, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.2.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 1.2



Points to Remember

- Consider the surface to be cleaned while you are selecting cleaning products to use
- Follow the safety guidelines for handling the cleaning products



Application of learning 1.2.

Ask trainee to go in school's workshop for pasta making and select cleaning products used in cleaning workplace, tools and equipment.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Cleaning products are properly selected	1.1.Selection criteria are considered		
		1.2.Selection methods is considered		
		1.3.Selection steps are respected		



Indicative content 1.3: Selecting Ingredients Used in Pasta Making



Duration: 2hrs



Practical Activity 1.3.1: Selecting ingredients used in making the pasta



Notes to the trainer

- The trainer may demonstrate how to select ingredients used in pasta making.
- Avail the ingredient used in pasta making



Key steps:

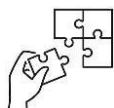
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to select ingredients used in pasta making.
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to select ingredients used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to select ingredients used in pasta making and monitor the procedures.
- Step5** Verify whether ingredients used in pasta making are well selected, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.3.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 1.3



Points to Remember

- The most flour used in making pasta is semolina because has high protein, high gluten which gives the chewy texture, carotenoid pigment and yellow colour to the pasta.
- Water and wheat flour are the main ingredients used to make pasta others are optional
- For getting best pasta better to flour which has 12-14% of gluten content



Application of learning 1.3.

Ask trainees to go in school's workshop for pasta making and select ingredients used in pasta making.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Ingredients are properly selected	1.1.Selection criteria are considered		
		1.2.Selection steps are respected		
		1.3.Appropriately ingredients are selected		



Indicative Content 1.4: Selecting Pasta Packaging Materials



Duration: 2hrs



Theoretical Activity 1.4.1: Description of pasta packaging materials



Notes to the trainer:

- Trainer may use small groups to describe the pasta packaging material
- The use of image or videos as didactic materials for pasta packaging material is required



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to answer the following questions:
- i. Suggest Types of packaging materials that should be used in pasta packaging?
 - ii. What do you know about function of packaging materials?
- Step2** Ask trainees to write their findings on papers, flip chart.
- Step3** Asks trainees to discuss on the provided answers and choose the correct ones.
- Step4** Provide the expert view and clarify ideas by using didactic materials.
- Step5** Address any questions or concerns.
- Step6** Ask trainees to read the key readings 1.4.1 in trainee manual



Points to Remember

- Make sure that all pasta packaging material are safe and acceptable by regulation
- During pasta packaging material we must respect the safety precaution of cleaning product



Practical Activity 1.4.2: Selecting pasta packaging materials



Notes to the trainer

- The trainer may demonstrate how to select packaging material used in pasta making.
- Avail the packaging material used for pasta making



Key steps:

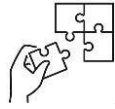
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to select packaging material used in pasta making.
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to select packaging material used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to select packaging material used in pasta making and monitor the procedures.
- Step5** Verify whether packaging material used in pasta making are well selected, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.4.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 1.4



Points to Remember

- Make sure that all pasta packaging material are safe and acceptable by regulation
- During pasta packaging material we must respect the safety precaution of cleaning product



Application of learning 1.4.

Ask trainees to go in school's workshop for pasta making and select packaging material used in pasta making.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Packaging material are properly selected	1.1.Selection criteria are considered		
		1.2.Selection steps are respected		
		1.3.Appropriate packaging materials are selected		



Indicative Content 1.5: Arranging Workplace for Pasta Making



Duration: 4hrs



Theoretical Activity 1.5.1: Description of arrangement criteria of tools and equipment



Notes to the trainer:

- Trainer may use small groups to describe the arrangement criteria of tools and equipment
- The use of image or videos as didactic materials is required



Key steps:

While delivering this activity, pass through the following steps:

Step1 Introduce the activity and ask trainees to answer the following questions:

- i. What do you know about pasta product flow chart?
- ii. What do you know about standard operating procedures (SOPs)?

Step2 Ask trainees to write their findings on papers, flip chart.

Step3 Asks trainees to discuss on the provided answers and choose the correct ones.

Step4 Provide the expert view and clarify ideas by using didactic materials.

Step5 Address any questions or concerns.

Step6 Ask trainees to read the key readings 1.5.1 in trainee manual



Points to Remember

- SOPs stands for Standard Operating Procedure
- SOPs It refers to a set of written instructions that describe the step-by-step process to properly perform a routine activity or task in an organization.



Practical Activity 1.5.2: Cleaning the workplace, tools and equipment



Notes to the trainer

- The trainer may demonstrate how to clean the workplace, tools and equipment
- Avail tools, equipment and cleaning product used in pasta making



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to clean the workplace, tools and equipment.
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to clean the workplace, tools and equipment used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to clean the workplace, tools and equipment used in pasta making and monitor the procedures.
- Step5** Verify whether workplace, tools and equipment used in pasta making are cleaned, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.5.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 1.5



Points to Remember

- You are recommended to use hygienic water while you are cleaning the workplace, tools and equipment
- Remember to use appropriate cleaning products depending on the surface you are going to clean
- You are recommended to use hot and cold water when you are cleaning the workplace, tools and equipment



Practical Activity 1.5.3: Checking cleanliness of workplace, tools and equipment



Notes to the trainer

- The trainer may demonstrate how to check the cleanliness of workplace, tools and equipment
- Avail tools and equipment used in checking cleanliness of pasta making workplace



Key steps:

While delivering this activity, pass through the following steps:

Step1 Introduce the activity and ask trainees to do the task described below:

You are asked to check the cleanliness of workplace, tools and equipment

Step2 Explain the task and provide clear work instruction (PPE, Time allocated)

Step3 Demonstrate how to check the cleanliness of workplace, tools and equipment used in pasta making. While demonstrating, explain the steps.

Step4 Ask trainees to check the cleanliness of workplace, tools and equipment used in pasta making and monitor the procedures.

Step5 Verify whether cleanliness of workplace, tools and equipment used in pasta making are checked, and provide feedback where necessary.

Step6 Ask trainees to read key reading 1.5.3 in trainee manual

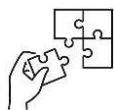
Step7 Ask trainees to perform the task provided in application of learning 1.5



Points to Remember

- You are recommended to use hygienic water while you are cleaning the workplace, tools and equipment
- Remember to use appropriate cleaning products depending on the surface you are going to clean
- You are recommended to use hot and cold water when you are cleaning the workplace, tools and equipment
- You are recommended to re-clean the surface when there are any residues found during the inspection

- Remember to re-inspect the area after re-cleaning to ensure that it meets cleanliness standards



Application of learning 1.5.

Ask trainees to go in school's workshop for pasta making to clean workplace, tools and equipment and checking the cleanliness of the workplace.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Workplace, tools and equipment are effectively cleaned	1.1.Steps of cleaning workplace are followed		
		1.2.Dry and wet cleaning methods is used		
		1.3.CIP and COP cleaning techniques are used		
2	Cleanliness of the workplace are properly checked	2.1.Visual inspection is applied		
		2.2.SWAB test is applied		
		2.3.Acidity test is applied		



Indicative Content 1.6: Preparing the Ingredients for Pasta Making



Duration: 2hrs



Practical Activity 1.6.1: Preparing the ingredients used in pasta making



Notes to the trainer

- The trainer may demonstrate how to prepare the ingredients used in pasta making
- Avail ingredient to be prepared when make pasta product



Key steps:

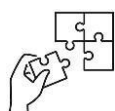
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
Ask trainees to prepare the ingredients used in pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to prepare the ingredients used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to prepare the ingredients used in pasta making and monitor the procedures.
- Step5** Verify whether the ingredients used in pasta making are properly prepared, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 1.6.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 1.6



Points to Remember

- You are recommended to check the quality of ingredients to ensure that are safe
- Calibrate the weighing scale before use it, in order to weigh the ingredients accurately
- Remember to sift the flour before weighing



Application of learning 1.6.

Ask trainees to go in school's workshop for pasta making to check the quality of ingredients and to weigh the ingredients used in pasta making.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	The quality of ingredients are effectively checked	1.1.Visual inspection test is conducted		
		1.2.Smell is tested		
		1.3.Float test for eggs is conducted		
2	The ingredients are accurately weighed	2.1.Weighing steps are respected		
		2.2.Weighing balance is calibrated		
		2.3.The ingredient ratios are respected		



Learning Outcome 1 end Assessment

Written assessment

Q1. Answer the following statements with appropriate tools or equipment from the given list (**mops, sweepers, washing machine, extruder, dough mixer, drying rack, packaging machine, weighing balances**)

- a).....are used for cleaning and drying floors in the processing area
- b).....are used to remove dry debris such as dust, crumbs, or small pieces of pasta from floors
- c)drying racks are used for placing fresh pasta after it has been shaped but before it undergoes drying in an oven or air-drying process.
- d).....are essential for accurately measuring ingredients such as flour, water, eggs, and salt.
- e).....automates the packing process for finished pasta products into bags or boxes for distribution.

Answers: a) Mops b) Sweepers c) drying rack d) Weighing balances e) Packaging machine

Q2. Answer by true or false based on the meaning of the following statements

- a)The primary purpose of adjustment is to optimize performance, improve accuracy, or adapt the tool or equipment to a particular job or condition.
- b)It is important to follow user manuals while you are adjusting tools or equipment
- c) Wearing appropriate Personal Protective Equipment (PPE) isn't crucial while you are selecting the cleaning products
- d)Detergents are cleaning products used to remove food debris, grease and dirt. They cannot kill bacteria and microorganisms.
- e)Chemical ingredients of the cleaning product are not one among many factors that influence whether a cleaning chemical will cause health problems.

Answers: a) true b) true c) false d) true e) False

Q3. Circle the answer to the following statements

- a) The following are selection criteria of ingredient used in pasta making except:
 - i. Bulk density of flour
 - ii. Water absorption capacity of flour
 - iii. Apparent viscosity
 - iv. Texture of flour
 - v. Spaghetti

- b)** The following are types of packaging materials for dried pasta except:
- i. Plastic packaging
 - ii. Paperboard boxes
 - iii. Glass containers
 - iv. Biodegradable films
 - v. Plastic films
- c)** The following are functions of packaging materials used to package pasta except:
- i. Protection
 - ii. Helps in storage
 - iii. Helps in transportation
 - iv. Providing products information
 - v. Portions size
- d)** The following are the purpose of work area arrangement except
- i. Maximize efficiency
 - ii. Improve safety
 - iii. Enhance productivity
 - iv. Quality control
 - v. **Clean-Out-Place**

Answers: a)v b)v c)v d)v

Q4. Match the following types of ingredients which is in column A with it's checking quality/quality parameters which is in column B.

Answers	column A	column B
	1. Flour	a. Freshness Test (Float Test): Place it in a bowl of water. A fresh one sinks and lays flat, while an old one will float or stand upright, indicating it has gone bad.
	2. Eggs	b. Look for a consistent colour (usually white to pale yellow). It should be free of lumps, dark spots, or signs of insects.
	3. Water	c. Should be free-flowing and not clumped together, which would indicate moisture contamination.
	4. Salt	d. Use one with a neutral taste to avoid any unwanted flavours being transferred to the pasta.

Answers: 1.b ,2.a ,3.d ,4.c

Your school needs to produce the pasta to be eaten by the parents and children in the open day. Asks trainees to go to the pasta making workshop to perform the following task within 2 hours. All resources needed are available in the workshop

Task 1: Select materials, tools and equipment used in pasta making

Task2: Adjust tools and equipment used in pasta making

Task 3: Clean the workplace, tools and equipment

Task 4: Check the cleanliness of the workplace (by using vision inspection, acidity test and SWAB test)

Task 5: Prepare (check the quality of ingredients and weigh ingredients using 2kg of wheat flour) used in making pasta

SN	Criteria	Indicator	Score	
			Yes	No
1	Materials, tools and equipment are properly selected according to pasta making	1.1.Cleaning products are selected		
		1.2.Ingredients are selected		
		1.3.Packaging materials are selected		
		1.4.Tools are selected		
		1.5.Equipment are selected		
2	Tools and equipment are appropriately adjusted according to pasta making	2.1.Tools are adjusted		
		2.2.Equipment are adjusted		

3	Workplace, tools and equipment are well cleaned according to pasta making	3.1.Workplace are cleaned		
		3.2.Tools are cleaned		
		3.4.Equipment are cleaned		
4	Cleanliness of workplace are accurately checked according to pasta making	4.1.Vision inspection is tested		
		4.2.Acidity test is conducted		
		4.3.SWAB test is conducted		
5	Ingredients are effectively prepared according to pasta making.	5.1.Quality of ingredients are checked		
		5.2.Ingredients are weighed		

END



Further information to the trainer

Bresciani, A., Pagani, M. A., & Marti, A. (2022). *Pasta-making process: A narrative review on the relation between process variables and pasta quality*. *Foods*, 11(3), 256.

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Learning Outcome 2: Make Fresh Pasta



Indicative contents

2.1 Making Dough for Pasta

2.2 Checking Quality Parameters of Dough

2.3 Performing Extrusion of the Dough for Pasta Making

Key Competencies for Learning Outcome 2: Make Fresh Pasta

Knowledge	Skills	Attitudes
• Description of pasta dough quality parameters • Identification of type of pasta • Description of physical changes of dough that occur during extrusion	• Mixing the ingredients used in pasta making • kneading and resting dough for pasta • Checking the quality of dough • Extruding the dough for pasta making	• Being careful while making dough • Being vigilant while checking the quality of dough • Paying attention while extruding the dough



Duration: 20 hrs

Learning outcome 2 objectives:



By the end of the learning outcome, the trainees will be able to:

1. Mix properly the ingredients used in making the pasta according to the mixing techniques
2. Knead and rest appropriately the dough according to the kneading techniques and resting conditions
3. Describe correctly pasta dough quality parameters
4. Check properly the quality of dough according to the quality parameters
5. Describe correctly the dough extrusion according to the types of pasta products
6. Extrude appropriately the dough according to the extrusion methods
7. Describe correctly physical changes of dough that occur during extrusion



Resources

Equipment	Tools	Materials
• Working table • Mixing bowl • Pasta machine (Extruder)	• Knives, • Ravioli cutters • Gnocchi boards • Spaghetti rollers • Rolling pin cutters • Waste bin	• wheat flour • Eggs • Salt • Oil • Spices



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail tools and equipment used in making fresh pasta and make sure that they are in good working conditions.
- Avail didactic materials used for pasta making like:(manuals/guides, photos, audio-visuals, protocols)
- Make sure that both classroom and workshop are available
- Avail semolina wheat flour and water



Indicative Content 2.1: Making Dough for Pasta



Duration: 7hrs



Practical Activity 2.1.1: Mixing ingredients for pasta dough



Notes to the trainer

- The trainer may demonstrate how to mix ingredients for pasta making
- Avail the ingredient to be mixed while making pasta product
- Avail equipment used in dough making like dough mixer and its respective alternative.



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to go in pasta making workshop to mix the ingredients for pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to mix ingredients used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to mix ingredients used in pasta making and monitor the procedures.
- Step5** Verify whether ingredients used in pasta making are mixed, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 2.1.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 2.1



Points to Remember

- Safety precaution must be respected while using dough mixer
- Nail must be cut and use cleaned hand while using hand mixing



Practical Activity 2.1.2: Kneading the dough for pasta making



Notes to the trainer

- The trainer The trainer may demonstrate how to knead the dough for pasta making
- Avail the dough to be kneaded when making pasta product



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
 - I. You are asked to knead the dough for pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to knead the dough used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to knead the dough used in pasta making and monitor the procedures.
- Step5** Verify whether dough used in pasta making are kneaded, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 2.1.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 2.1



Points to Remember

- While kneading pasta dough, kneading techniques must be respected



Practical Activity 2.1.3: Resting dough for pasta



Notes to the trainer

- The trainer may demonstrate how to rest the dough for pasta making
- Avail the dough to be rested when making pasta product



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to rest the dough for pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to rest the dough used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to rest the dough used in pasta making and monitor the procedures.
- Step5** Verify whether dough used in pasta making are rested, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 2.1.3 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 2.1



Points to Remember

- Rested dough must be covered in order to preserve moisture
- Resting condition must be controlled during resting period



Application of learning 2.1.

Ask trainees to go in pasta making workshop to make dough for pasta by performing the following Task:

1. To mix ingredient used in pasta making.
2. To knead dough for pasta making
3. To rest the dough for pasta making

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Ingredients for pasta dough making are well used	1.1.Appropriate wheat flour is used		
		1.2.Salt is added		
		1.3.Eggs are added		
		1.4.Water is added		
		1.5.Ingredients ratios is respected		
2	Pasta dough is well made	2.1.Mixing is performed		
		2.2.Kneading is performed		
		2.3.Resting is performed		



Indicative content 2.2: Checking quality parameters of dough



Duration: 3hrs



Practical Activity 2.2.1: Checking the quality of dough



Notes to the trainer

- The trainer may demonstrate how to check the quality of dough for pasta making
- Avail the dough to be checked when making pasta product



Key steps:

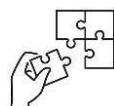
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
You are asked to check the quality of dough for pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to check the quality of dough used in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to rest the dough used in pasta making and monitor the procedures.
- Step5** Verify whether dough used in pasta making are checked, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 2.2.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 2.2



Points to Remember

- Maintain the hygiene while you are checking the quality of pasta dough



Application of learning 2.2.

Ask trainees to go in school's workshop for pasta making to check the quality of dough used in pasta making.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Quality of dough are effectively checked	1.1.Extensibility is checked		
		1.2.Elasticity is checked		
		1.3.Viscosity is checked		
		1.4.Stickiness is checked		
		1.5.Resistance to deformation is checked		



Indicative Content 2.3: Performing Extrusion of the Dough for Pasta Making



Duration: 10hrs



Theoretical Activity 2.3.1: Description of dough extrusion



Notes to the trainer:

- Trainer may use small groups to describe the dough extrusion used to make the pasta
- The use of image or videos as didactic materials is required



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to answer the following questions:
- i. What do you know about pasta extrusion?
 - ii. Suggest any type of pasta do you know?
- Step2** Ask trainees to write their findings on papers, flip chart.
- Step3** Asks trainees to discuss on the provided answers and choose the correct ones.
- Step4** Provide the expert view and clarify ideas by using didactic materials.
- Step5** Address any questions or concerns.
- Step6** Ask trainees to read the key readings 2.3.1 in trainee manual



Points to Remember

- Extrusion of dough is conducted for the purpose of achieving the desired shape of the pasta
- Die is a part of extruder machine where the pasta is extruding out
- Pasta are classified into long and short
- Type of pasta depending on the shape



Practical Activity 2.3.2: Extruding the dough for pasta making



Notes to the trainer

- The trainer may demonstrate how to extrude the dough for pasta making
- Avail the rested dough to be extruded when making pasta product



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to do the task described below:
Ask trainees to extrude the pasta dough for pasta making
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to extrude the pasta dough in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to extrude the pasta dough in pasta making and monitor the procedures.
- Step5** Verify whether pasta dough is extruded, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 2.3.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 2.3



Points to Remember

- Cold and hot extruders are methods of extrusion used in pasta making
- Mixing the ingredients by the purpose of making the dough homogenous, firm and smooth
- Cold extruder using the temperature of 20-30 °c while hot extruder using 30-90°c



Theoretical Activity 2.3.3: Description of physical changes that occur during extrusion



Notes to the trainer:

- Trainer may use small groups to describe the physical changes that occur during extrusion
- The use of image or videos as didactic materials is required



Key steps:

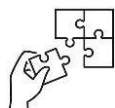
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to answer the following questions:
Suggest any physical changes that should be occur during extrusion
- Step2** Ask trainees to write their findings on papers, flip chart.
- Step3** Facilitate trainees to present their findings
- Step4** Provide the expert view and clarify ideas by using didactic materials.
- Step5** Address any questions or concerns.
- Step6** Ask trainees to read the key readings 2.3.3 in trainee manual



Points to Remember

- Extrusion involves forcing a material through a die to shape it into a continuous profile
- High temperature of extruder can lead to lower density due to material softening or gas formation
- low extrusion temperature of extruder during pasta processing can result in softer texture, higher moisture retention, and longer drying times, all of which affect the overall quality and production efficiency.



Application of learning 2.3.

Ask trainees to go to pasta making school workshop to extrude the fresh pasta by using cold and hot extrusion methods.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Report is correctly delivered	1.1.Company address is indicated		
		1.2.Competency gained is indicated		
		1.3.Recommendation is indicated		
2	Fresh pasta is properly extruded	2.1.Cold extrusion is applied		
		2.1Extrusion conditions are monitored		
		2.3.Hot extrusion is applied		



Learning outcome 2 end assessment

Written assessment

Q1. Fill the blank space by using appropriate purposes of mixing ingredients (Hydration of Flour, Gluten Development, Incorporation of Ingredients, Texture Improvement, Temperature Control and resting period preparation)

- a)mixing the flour with wet ingredients (such as eggs and oil) allows the flour to absorb moisture.
- b) as the ingredients are mixed, gluten proteins in the flour begin to bond and form a network.
- c) mixing ensures that all ingredients are evenly distributed throughout the dough.
- d) the mixing process helps achieve a specific texture in the dough
- e) mixing by hand or using a machine can help control the temperature of the dough.+ -

Answers:

- a) Hydration of Flour
- b) Gluten Development
- c) Incorporation of Ingredients
- d) Texture Improvement
- e) Temperature Control

Q2. Read the following statements and answer by true if it is correct or false if it is wrong

- a. Hand mixing involves using your hands to combine flour, eggs, and other ingredients.
- b. The development of gluten is crucial in pasta making as it affects the elasticity and chewiness of the final product.
- c. Electric mixers can also develop gluten efficiently but may do so too quickly if monitored closely.

- d. The primary purpose of kneading is to develop gluten, which is a network of carbohydrate formed when flour is mixed with water.
- e. The primary goal of folding as kneading technique is to create layers within the dough that can help improve its elasticity and strength.
- f. To cook a small piece of the rolled-out pasta in boiling salted water for 1-3 minutes is used in checking the quality of dough used in pasta making.

Answers: a)True b)True c)False d)False e)True f)True

Q3. Encircle the correct answer from the following statements

- a) The following are similarities of folding, stretching, and rolling as kneading techniques for pasta dough EXCEPT:
 - i. Gluten Development
 - ii. Texture Improvement
 - iii. Incorporation of Air
 - iv. Uniformity in thickness
 - v. Less Physical Strain
- b) The following are kneading techniques used in making pasta EXCEPT:
 - i. Stretching
 - ii. Folding
 - iii. Rolling
 - iv. Mixing
- c) The following are the ingredients used in making pasta EXCEPT:
 - i. Durum wheat flour
 - ii. Eggs
 - iii. Water
 - iv. Maize flour
- d) The following are the quality parameters of pasta dough EXCEPT:
 - i. Extensibility
 - ii. Elasticity
 - iii. Viscosity
 - iv. Stickiness
 - v. Resistance to formation

Answers: a)v b)iv c)iv d)v

Q4. Match the following types of pasta in column A with its meaning in column B, write the letter corresponding to the correct answer

Answers	column A	column B
	1. Spaghetti	a. Shaped like a bow-tie, works well with lighter tomato or cream sauces, and often used in salads
	2. Fettuccine	b. Larger, ridged tubes that hold onto sauces well, commonly used in baked pasta dishes
	3. Linguine	c. Tubular pasta with diagonally cut ends. Great with hearty, chunky sauces like meat or vegetable ragu.
	4. Vermicelli	d. are a type of food made from unleavened dough, which is typically stretched, rolled, or extruded into thin, long strips or strings
	5. Noodles	e. is a type of long, thin pasta that is similar to spaghetti but slightly thinner.
	6. Penne	f. Similar to spaghetti but slightly flatter, often paired with seafood-based sauces or lighter olive oil sauces
	7. Rigatoni	g. Thin, long strands that pair well with light, smooth sauces like marinara or olive oil-based sauces.
	8. Farfalle (bow-Tie)	k. Flat, ribbon-like strands, slightly wider than spaghetti, often served with heavier sauces like Alfredo or Bolognese

Answers: 1. g, 2. k, 3. f, 4. e, 5. d, 6. c, 7. b, 8. a

Practical assessment

Your school is planning to host the parents during the meeting. They want a pasta to be sold to their stakeholder after meeting. Ask trainees to go in workshop for pasta making to make 1kg of fresh spaghetti and 1kg of macaroni within 4 hours. All necessary tools and equipment are available in the workshop.

Task 1: Making dough used in fresh spaghetti and macaroni

Task2: Checking the quality of dough used in fresh spaghetti and macaroni

Task 3: Performing fresh spaghetti and macaroni extrusion

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1	Pasta dough is properly made	1.1.Ingredients are mixed		
		1.2.Dough is kneaded		
		1.3.Dough is rested		
2	Quality of dough is effectively checked	2.1.Extensibility is checked		
		2.2.Viscosity is checked		
		2.3.Stickiness is checked		
		2.4.Resistance to deformation is checked		
		2.5.Elasticity is checked		
3	Fresh pasta is properly extruded	3.1.Shape of spaghetti is made		
		3.2.Shape of macaroni is made		
		1kg for macaroni is achieved		
		1kg for spaghetti is achieved		

END



Further information to the trainer

Bresciani, A., Pagani, M. A., & Marti, A. (2022). Pasta-making process: A narrative review on the relation between process variables and pasta quality. Foods, 11(3), 256.

Pagani, M. A., Resmini, P., & Dalbon, G. (1989). Influence of the extrusion process on characteristics and structure of pasta. Food Structure, 8(2), 2.

Sarghini, F., Romano, A., & Masi, P. (2016). Experimental analysis and numerical simulation of pasta dough extrusion process. Journal of Food Engineering, 176, 56-70.

Ziobro, R., Korus, J., Witczak, M., & Juszczak, L. (2012). Influence of modified starches on properties of gluten-free dough and bread. Part II: Quality and staling of gluten-free bread. Food Hydrocolloids, 29(1), 68-74.

Learning Outcome 3: Preserve Pasta



Indicative contents

- 3.1 Drying Fresh Pasta
- 3.2 Cooling The Pasta
- 3.3 Checking Pasta Quality
- 3.4 Packaging of Pasta
- 3.5 Storing Pasta

Key Competencies for Learning Outcome 3: Preserve Pasta

Knowledge	Skills	Attitudes
• Identification of drying, cooling, checking quality and packaging purposes for pasta • Description of factors affecting pasta drying • Identification of labelling information of pasta • Description of storage requirements for pasta	• Drying fresh pasta by air, sun, oven drying and food dehydrator • Cooling the pasta • Checking the pasta quality by physical appearance and moisture content • Packaging the pasta	• Being accountable when drying the pasta • Being careful when cooling the pasta • Being vigilant when checking the pasta quality • Being careful when packaging the pasta • Being attentive while storing the pasta



Duration: 15 hrs

Learning outcome 3 objectives:



By the end of the learning outcome, the trainees will be able to:

1. Identify correctly drying, cooling, checking quality and packaging purposes for pasta
2. Describe correctly the factors affecting pasta drying
3. Dry effectively fresh pasta according to the drying methods
4. Cool properly the pasta according to the cooling techniques
5. Check appropriately the pasta quality based on physical appearance and moisture content
6. Package properly the pasta
7. Identify correctly the labelling information for pasta
8. Describe correctly the storage requirements for pasta



Resources

Equipment	Tools	Materials
● Projector, ● Whiteboard, ● Chalkboard, ● Food dehydrator, ● Oven dryer, ● Drying rack, ● Cooler, ● Packaging machine	● Knives, ● Waste bin ● Moisture meter	● Packaging materials, ● Scotch, Glue, and ● Labels, ● Flipchart, ● Marker pen, ● Chalks



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail tools and equipment used in preserve pasta and make sure that they are in good working conditions.
- Avail didactic materials used for preserve pasta like:(manuals/guides, photos, audio-visuals, protocols)
- Make sure that both classroom and workshop are available
- Avail packaging materials and labels



Indicative content 3.1: Drying fresh pasta



Duration: 3hrs



Theoretical Activity 3.1.1: Description of pasta drying



Notes to the trainer:

- Trainer may use small groups to describe the purpose and factor affecting pasta drying during pasta making.
- The use of image or videos as didactic materials related to pasta drying is required



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to answer the following questions:
- i. What should you understand about the purpose of pasta drying during pasta making?
 - ii. Suggest the different factor affecting pasta drying during pasta making
- Step2** Ask trainees to write their findings on papers, flip chart.
- Step3** Asks trainees to present their findings.
- Step4** Provide the expert view and clarify ideas by using didactic materials.
- Step5** Address any questions or concerns.
- Step6** Ask trainees to read the key readings 3.1.1 in trainee manual



Points to Remember

- During pasta drying the factors affecting drying condition must be respected in order to produce the product of good quality.



Practical Activity 3.1.2: Applying pasta drying methods



Notes to the trainer

- The trainer may demonstrate how to apply pasta drying methods as used in pasta making.
- Avail the fresh pasta to dried while making pasta product
- Avail tools and equipment used in drying pasta product.



Key steps:

While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to go in pasta making workshop to apply pasta drying methods.
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to apply pasta drying methods in pasta making. While demonstrating, explain the steps.
- Step4** Ask trainees to apply the pasta drying method in pasta making and monitor the procedures.
- Step5** Verify whether pasta drying methods are applied and provide feedback where necessary.
- Step6** Ask trainees to read key reading 3.1.2 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 3.1



Points to Remember

- While drying pasta the air drying method must be followed to preserve the flavour of final product.



Application of learning 3.1.

Ask trainees to go in school's workshop for pasta making to apply drying methods used in drying the pasta.

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1	Drying methods are effectively applied during pasta making	1.1.Air-drying is performed		
		1.2.Sun-drying is performed		
		1.3.Food dehydrator is used		
		1.4.Oven drying is performed		



Indicative Content 3.2: Cooling of Pasta



Duration: 3hrs



Practical Activity 3.2.1: Cooling the pasta



Notes to the trainer

- The trainer may demonstrate how to cool the pasta
- Avail the dried pasta to be cooled



Key steps:

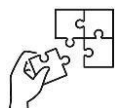
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to go in pasta making workshop to cool the pasta
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to cool the pasta. While demonstrating, explain the steps.
- Step4** Ask trainees to cool the pasta and monitor the procedures.
- Step5** Verify whether the pasta is well cooled, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 3.2.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 3.2



Points to Remember

- Cooling pasta after drying is crucial as it help in maintaining its texture and preventing moisture condensation which can lead to spoilage
- Maintain the hygiene while cooling the pasta
- When cooling the pasta respect the cooling conditions (time and temperature) in order to achieve the quality of final product



Application of learning 3.2.

Ask trainees to go to school pasta-making workshop to cool the pasta.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Pasta is properly cooled	1. 1. Cooling conditions are respected		
		1.2.Cooling steps are respected		
		1.3.Oven cooling techniques are applied		



Indicative Content 3.3: Checking Pasta Quality



Duration: 3hrs



Practical Activity 3.3.1: Checking the pasta quality



Notes to the trainer

- The trainer may demonstrate how to check the pasta quality
- Avail cooled pasta to be checked when making pasta product.



Key steps:

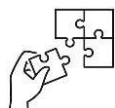
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to go in pasta making workshop to check the pasta quality
- Step2** Explain the task and provide clear work instruction (PPE, Time allocated)
- Step3** Demonstrate how to check the pasta quality. While demonstrating, explain the steps.
- Step4** Ask trainees to check the pasta quality and monitor the procedures.
- Step5** Verify whether the pasta quality is well checked, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 3.3.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 3.3



Points to Remember

- Checking pasta quality is recommended due to helps in ensuring that pasta meets the desired standards of texture, flavour and appearance
- Colour of pasta depending on the type of wheat flour used as a main ingredient
- Standard moisture content of the pasta is in range of 10-12%



Application of learning 3.3.

Ask trainees to go to school pasta-making workshop to check the quality of pasta.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1.	Pasta quality is properly checked	1.1.Colour is checked		
		1.2.Shape is checked		
		1.3.Defect is checked		
		1.4.Moisture content is checked		



Indicative content 3.4: Packaging of Pasta



Duration: 3hrs



Practical Activity 3.4.1: Packaging the pasta



Notes to the trainer

- The trainer may demonstrate how to perform pasta-packaging process in pasta making.
- Avail the well checked pasta to be packaged.



Key steps:

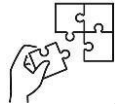
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to go in pasta making workshop to perform pasta-packaging process
- Step2** Explain packaging and its procedures
- Step3** Demonstrate how to package pasta products. While demonstrating, explain the steps.
- Step4** Ask trainees to package the pasta and monitor the procedures.
- Step5** Verify whether the pasta is well packaged, and provide feedback where necessary.
- Step6** Ask trainees to read key reading 3.4.1 in trainee manual
- Step7** Ask trainees to perform the task provided in application of learning 3.4



Points to Remember

- Make sure that all information on label are mentioned
- Packaging process must be respected



Application of learning 3.4.

Ask trainee to go school pasta making workshop and package the pasta.

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1.	Pasta is properly packaged	1.1.Weighing is performed		
		1.2.Filling is performed		
		1.3.Sealing is performed		
		1.4.Labelling information is indicated		



Indicative content 3.5: Storing Pasta



Duration: 3hrs



Theoretical Activity 3.5.1: Description of storage requirements



Notes to the trainer:

- Trainer may use small groups to describe the storage requirements of pasta.
- The use of image or videos as didactic materials related to storage requirements of pasta is required.



Key steps:

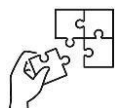
While delivering this activity, pass through the following steps:

- Step1** Introduce the activity and ask trainees to answer the following questions:
- i. What do you know about the storage conditions of pasta?
 - ii. Suggest the stock arrangement used in storing the pasta
- Step2** Ask trainees to write their findings on papers, flip chart.
- Step3** Asks trainees to present their findings.
- Step4** Provide the expert view and clarify ideas by using didactic materials.
- Step5** Address any questions or concerns.
- Step6** Ask trainees to read the key readings 3.5.1 in trainee manual



Points to Remember

- While storing the pasta basing on the type of pasta either dry or fresh
- The shelf life of fresh and dry pasta should be based on the storing techniques (room temperature, refrigeration and freezing)
- Use First In First Out system while making rotation of stock for using older products before the new products



Application of learning 3.5.

Ask trainee to go in pasta making workshop to store pasta.

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1	Pasta is properly stored	1.1.Storage conditions are considered		
		1.2.Storage arrangement are considered		
		1.3.Type of pasta(fresh and dry) are considered		



Learning outcome 3 end assessment

Written assessment

Q1. Fill the blank space by using appropriate purposes and factors affecting drying pasta (Preservation of Freshness, Texture Improvement, Cooking Properties, Flavor Concentration, Economic Factors, Temperature, types of pasta, Humidity and Airflow)

- a. Fresh pasta contains a significant amount of moisture, which can lead to spoilage if not consumed quickly.

Answer: Preservation of Freshness

- b. When pasta is dried, it undergoes changes in its starch structure.

Answer: Texture Improvement

- c. Dried pasta typically requires a longer cooking time than fresh pasta because it has absorbed less water during its preparation.

Answer: Cooking Properties

- d. This concentration can enhance the overall taste experience when consuming dried pasta dishes.

Answer: Flavor Concentration

- e. This aspect makes dried pasta an economically viable product for both producers and consumers

Answer: Economic Factors

- f.of the room where the pasta is drying plays a vital role. Warmer environments promote faster drying, which can be beneficial; however, if it's excessively hot, it may lead to uneven drying or cracking.

Answer: Temperature

- g. Differentrequire different drying times and methods. For example, filled pastas like ravioli need to be dried differently than long noodles like fettuccine or tagliatelle due to their structure and moisture content.

Answer: Type of pasta

- h.in the air can significantly affect how quickly pasta dries. On particularly humid days, moisture in the air can cause pasta to dry too slowly, leading to a sticky texture.

Answer: Humidity

Q2. Read the following statements and answer by true if it is correct or false if it is wrong

- a. Air-drying is one of the simplest method for drying pasta?
- b. Oven drying usually takes about 1-2 hours depending on thickness and moisture content of the pasta being dried
- c. Sun-drying utilizes artificial energy to remove moisture from pasta
- d. Oven drying is another efficient method for drying pasta quickly using heat from a refrigerator?

- e. Cooling the pasta after drying helps it acclimate to room temperature, which stabilizes its texture and hardness. This makes it more resilient for storage and handling.
- f. If you're cooling pasta after drying it, using a fan or air conditioner can help remove excess moisture and speed up the cooling process before storage.
- g. When pasta is dried, cooling it properly is essential for maintaining its texture and providing moisture, which can lead to live long of the pasta.
- h. Once pasta cooled, should be stored at a temperature below 25°C (77°F), with humidity levels below 65%, to prevent moisture reabsorption.

Answers: a)True b)True c)False d)False e)True f)True g)False h)True

Q3. Encircle the correct answer from the following statements

- a. The following are purposes of checking pasta quality EXCEPT:
 - i. Texture evaluation
 - ii. Checking the cooking performance
 - iii. Ensuring the moisture content of pasta
 - iv. Checking for cracks or brittleness of pasta
 - v. To decline the shelf life of pasta
- b. The following are physical quality parameters of pasta EXCEPT:
 - i. Color
 - ii. Shape and size
 - iii. Absence of defects
 - iv. Moisture content
- c. **The following are the storage conditions of pasta EXCEPT:**
 - i. Temperature
 - ii. Humidity
 - iii. Storage container
 - iv. cooking time
 - v. Shelf life
- d. **The following are the criteria to consider while arranging the pasta stock EXCEPT:**
 - i. Pasta type categorization
 - ii. Shelving arrangement
 - iii. Rotation system
 - iv. Accessibility considerations
 - v. Type of wheat flour

Answers: a)v b)iv c)iv d)v

Q4. Match the following packaging process of pasta in column A with its meaning in column B, write the letter corresponding to the correct answer

Answers	column A	column B
	1. Weighing the Product	a. the pasta is transferred to a mechanical system designed for packaging. This system often includes buckets or conveyors that move the pasta towards the packaging station.
	2. Transfer to Packaging System	b. The packaging process begins with weighing the dried pasta to ensure that each package contains the correct amount.
	3. Filling packages	c. the packages are sealed to ensure freshness and prevent moisture from entering.
	4. Sealing packages	d. the pasta is filled into various types of packages, which may include cellophane bags or boxes.
	5. Quality Control Checks	e. A final weight check is conducted to ensure that each package meets regulatory requirements and company standards for weight accuracy.
	6. Final weight check	f. packages undergo quality control checks to detect any open flaps or foreign materials that may have entered during packaging.
	7. Packing into cases	g. the packaged pasta is placed into larger cases for shipping and distribution

Answers: 1. b , 2. a ,3. d, 4. c, 5. f, 6. e, 7. g

Practical assessment

Your school plan to go to exhibition of food processing products. They want one 1 kg of spaghetti and 1kg of macaroni. Ask trainees to go in pasta making workshop to preserve 1kg of spaghetti and 1kg of macaroni. all resources needed are available in the workshop.

Task 1: Dry spaghetti and macaroni.

Task2: Cool the dried spaghetti and macaroni.

Task 3: Checking the quality of spaghetti and macaroni. (colour, shape, defects and moisture content)

Task4: Fill and seal and label the package

Checklist:

SN	Criteria	Indicator	Score	
			Yes	No
1	Drying of the pasta is properly performed	Drying method is applied		
		Drying conditions are monitored		
		Drying steps are followed based on drying method		
2	Dried pasta is effectively cooled	Cooling technique is applied		
		Cooling conditions are monitored		
		Cooling steps is followed based on cooling technique		
3	Quality of pasta is effectively checked	Golden yellow colour is achieved		
		Uniform shape is achieved		
		Non cracks/spots pasta is achieved		
		Moisture content of 10-12% of pasta is achieved		
4	Pasta is properly filled, sealed and labelled	1kg of spaghetti is filled and sealed		
		1 kg of macaroni is filled and sealed		
		Packaging steps is followed		
		Labelling information is indicated		

END



Further information to the trainer

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Ficco, D. B. M., De Simone, V., De Leonardis, A. M., Giovanniello, V., Del Nobile, M. A., Padalino, L., ... & De Vita, P. (2016). Use of purple durum wheat to produce naturally functional fresh and dry pasta. *Food Chemistry*, 205, 187-195.

Gull, A., Prasad, K., & Kumar, P. (2017). Quality changes in functional pasta during storage in two different packaging materials: LDPE and BOPP. *Journal of Food Processing and Preservation*, 41(5), e13115.

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