



RQF LEVEL 4



FOPSM403
FOOD PROCESSING

Sausage and Meat Ball Making

TRAINER'S MANUAL

October, 2024



SAUSAGE AND MEAT BALL MAKING

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ACRONYMS

°F:	Degree Fahrenheit
°C:	Degree Celsius
%:	Percentage
BHA:	Butylated Hydroxyanisole
BHT:	Butylated Hydroxyl Toluene
CBT:	Competency- Based Training
FOP:	Food Processing
HDPE:	High-density polyethylene
Hrs:	Hours
KOICA:	Korean International Cooperation Agency
Kg:	Kilometer
LDPE:	Low-density polyethylene
MAP:	Modified atmosphere packaging
Mm:	Milli Meter
PE:	Polyethylene
PET:	Polyethylene Terephthalate
PH:	Potential Hydrogen
PP:	Polypropylene
PPEs:	Personal Protective Equipment
PVC:	Polyvinyl Chloride
RTB:	Rwanda TVET Board
SM:	Sausage Making
SOPs:	Standard Operating Procedures
TBHQ:	Tertiary butyl hydroquinone
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 "**Sausage and Meat Ball Making.**" Students 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 students 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 students review the key reading and the points to remember section.

MODULE CODE AND TITLE: FOPSM403 SAUSAGE AND MEAT BALL MAKING

Learning Outcome 1: Prepare Workplace

Learning Outcome 2: Prepare Ingredients

Learning Outcome 3: Mould Sausage and Meat Ball

Learning Outcome 4: Preserve the Meat Ball and Sausage

Learning Outcome 1: Prepare workplace



Indicative contents

1.1 Selection of Tools and Equipment used for Sausage and Meat Ball Making

1.2 Selection of Materials used in Preparation the Workplace of Sausage and Meat Ball

Making

1.3 Selection of Packaging Materials used in Sausage and Meat Ball Making

1.4 Cleaning of Tools and Equipment

1.5 Arrange Workplace for Sausage and Meat Ball Making

Key Competencies for Learning Outcome 1: Prepare Workplace

Knowledge	Skills	Attitudes
• Description of tools and equipment used in sausage and meat ball making • Description of packaging materials used in sausage and meat ball making • Description of methods and techniques of cleaning the workplace, tools and equipment • Description of ingredient used to make meat ball and sausage. • Explanation of work area arrangement • Description of sausage and meat ball making process • Description of checking methods of cleanliness of workplace	• Selecting tools and equipment • Adjusting tools and equipment • Cleaning workplace, tools and equipment • Arranging workplace • Checking the cleanliness of workplace	• Being careful when selecting tools and equipment • Being careful when adjusting tools and equipment Being well oriented when cleaning workplace, tools and equipment • Being well organised when arranging workplace • Being careful when checking cleanliness of workplace



Duration: 10 hrs

Learning outcome 1 objectives:



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

1. Identify properly tools and equipment used in making sausage and meat ball according to the intended use
2. Select properly tools and equipment used in making sausage and meat ball according to the intended use
3. Adjust appropriately tools and equipment used in making sausage and meat ball according to the adjustment procedures.
4. Identify properly cleaning product used in making sausage and meat ball according to their types.
5. Describe clearly the ingredients used in making sausage and meat ball according to their classes.
6. Describe correctly the packaging materials used in making sausage and meat ball according to type of product.
7. Clean effectively workplace, tools and equipment used in making sausage and meat ball according to the protocol.
8. Describe correctly workplace arrangement used in making sausage and meat ball according to the SOPs and processing line
9. Check appropriately cleanliness of workplace according to the checking methods



Resources

Equipment	Tools	Materials
• Air compressor • Water sprayer • Washing machine • Pressure cleaner • Meat mincer • Meat mixer • Bowl chopper • Icing machine • Stuffer • Clipper	• Mops and brushes • Squeegees • Sweepers • Buckets • Crates • Trolley • pH meter • Thermometer • Cutting knives • Receiving bowls	• Water • Detergent • Towel • Hand cloves • Face mask • Hair cover sanitizer and disinfectant • Salt • Curing agents • Nitrate

• Smoker • Fryer • Boiler • Freezer • Cooling machine • Slicer • Chopping machine • Oven • Ball forming machine • Vacuum packing machine	• Hanging racks	• Nitrite • Starter culture • Curing accelerator • Flavour enhancers • Anti-oxidants • Ice • Binders and fillers • Seasonings • Spices • Herbs • Poultry meat • Pork meat • Beef meat • Game meat • Lamb meat • Goat meat
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Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail a classroom and workshop.
- Avail materials, tools and equipment used for sausage and meatball making, and make sure that they are in good working condition and verify if they are not expired.
- Prepare teaching aids and didactic materials (manuals/guides, task sheets, photos, audio-visuels, protocols)



Indicative content 1.1: Selection of Tools and Equipment used for Sausage and Meat Ball Making



Duration: 2hrs



Theoretical Activity 1.1.1: Identification of tools and equipment used in sausage and meat ball making



Notes to the trainer:

- Trainer may use small groups to identify tools and equipment used in sausage and meat ball making.
- The use of pictures or videos to identify tools and equipment as didactic materials is required.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to answer the following questions:
- i. Which tools and equipment do you think can be used in sausage and meat ball making?
 - ii. Suggest safety precautions of tools and equipment used in sausage and meat ball making?
- Step 2:** Ask trainees to write their findings on papers, flip chart, blackboard or white board.
- Step 3:** Engage trainees to present the findings.
- Step 4:** Provide the expert view and clarify ideas by using didactic materials.
- Step 5:** Address any questions or concerns.
- Step 6:** Ask trainees to read the key readings 1.1.1 in trainee manual.



Points to Remember

- It is imperative to use appropriate tools and equipment to ensure safety and quality of sausage and meat ball. Respect safety precautions for tools and equipment.



Practical Activity 1.1.2: Selecting and adjusting tools and equipment used in sausage and meat ball making

Notes to the trainer

- The trainer may demonstrate how select and adjust tools and equipment used in sausage and meat ball making.
- For the effective delivery, it is recommended to avail tools and equipment to be selected and adjusted.



Key steps:

While delivering this activity, pass through the following steps:

- Step 1:** Introduce the activity and ask trainees to go in meat processing workshop to select and adjust tools and equipment used in sausage and meat ball making.
- Step 2:** Explain the task and provide clear work instructions (Time allocated).
- Step 3:** Demonstrate how to select tools and equipment used in sausage and meat ball making. While demonstrating, explain the procedures.
- Step 4:** Ask trainees to select tools and equipment used in sausage and meat ball making and monitor the procedures.
- Step 5:** Verify whether tools and equipment used in in sausage and meat ball making are well select and provide feedback where necessary.
- Step 6:** Ask trainees to read the key readings 1.1.2 in trainee manual.
- Step 7:** Ask trainees to perform the task provided in application of learning 1.1.



Points to Remember

- Tools and equipment used in sausage and meat ball making are selected based on selection criteria and selection procedures must be respected.
- While adjusting tools and equipment used in sausage and meat ball making, respect user manual guide and seek for expert to help If it became complex.
- You are recommended to respect safety precautions while using tools and equipment.



Application of learning 1.1.

Ask learners to go in school workshop to select and adjust tools and equipment used in making sausage and meat ball.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Tools and equipment are properly selected	Tools are selected		
		Equipment is selected		
2	Tools and equipment are properly adjusted	Tools are adjusted		
		Equipment are adjusted		



Indicative content 1.2: Selection of materials used in preparation the workplace of sausage and meat ball making



Duration: 2hrs



Theoretical Activity 1.2.1: Identification of cleaning products used in sausage and meat ball making

Tasks:

- Trainer may use small groups to identify the cleaning products used in sausage and meat ball making.
- Avail cleaning products used in sausage and meat ball making.
- The use of image or videos as didactic materials is required.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: 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 and health precautions of using cleaning products used in sausage and meat ball making?
- iii. Suggest the direction for using cleaning products when cleaning the workplace?

Step 2: While selecting cleaning products there are criteria to consider. Suggest any?

Step 3: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 4: Asks trainees to present the findings.

Step 5: Provide the expert view and clarify ideas by using didactic materials.

Step 6: Address any questions or concerns.

Step 7: Ask trainees to read the key readings 1.2.1 in trainee manual.



Points to Remember

- Wear proper PPEs while using cleaning products.
- Remember to train the workers about chemical composition of cleaning products and how it can be diluted before use.



Theoretical Activity 1.2.2: Description of the ingredients used in sausage and meat ball making



Notes to the trainer:

- Trainer may use small groups to describe the ingredients used to make sausage and meat ball
- Avail ingredients used in making sausage and meat ball.
- 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. Ingredients used to make sausage and meat ball are classified into two classes. What do you think about those classes?
- II. While you are selecting ingredients used to make sausage and meat ball there are criteria to consider. Suggest any?

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

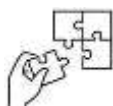
Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.2.2 in trainee manual.



Points to Remember

- Two classes of ingredients used to make meat ball and sausage are meat ingredient and non-meat ingredients.
- While selecting ingredients remember that the type of ingredients used influences the quality of final product.



Application of learning 1.2.

Ask learners to go in school workshop to select the cleaning products used in cleaning the workplace, tools and equipment and ingredients used in making sausage and meatball

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Cleaning products are properly selected	1.1 Selection criteria are considered		
		1.2 Safety precautions are considered		
	Ingredients are properly selected	1.3 Selection criteria are considered		
		1.4 Class of ingredients are considered		



Indicative content 1.3: Selection of packaging materials used in sausage and meat ball making



Duration: 2hrs



Theoretical Activity 1.3.1: Description of packaging material used to package sausage and meat ball



Notes to the trainer:

- Trainer may use small groups to describe the packaging materials used to package sausage and meat ball.
- The use of image or videos to describe the packaging materials 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 think about the packaging materials used to package sausage and meat ball?

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Engage trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.3.1 in trainee manual.



Points to Remember

- Packaging materials used to package sausage and meatball can be inform of plastic, aluminium foil, paperboard Boxes and meat can.



Practical Activity 1.3.2: Selecting packaging materials



Notes to the trainer

- The trainer is supposed to demonstrate how to select packaging materials used in sausage and meat ball making.
- For the effective delivery, it is recommended to avail different packaging materials which are mixed in order to select recommended one



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to select packaging materials used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to select packaging materials used in sausage and meat ball making. While demonstrating, explain the procedures.

Step 4: Ask trainees to select packaging materials used in sausage and meat ball making and monitor the procedures.

Step 5: Verify whether packaging materials used in sausage and meat ball making are well selected and provide feedback where necessary.

Step 6: Ask trainees to read key reading 1.3.2 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 1.3



Points to Remember

- Consider the type of product you are going to package while you are selecting packaging materials to use.
- Follow the safety guidelines for handling packaging materials.



Application of learning 1.3.

Ask learners to go in meat processing workshop to select packaging materials used in package sausage and meat ball.

Checklist

Criteria	Indicator	Score	
		Yes	No
Packaging materials are well selected.	Selection criteria are considered		
	Selecting steps are respected		



Indicative content 1.4: Cleaning of tools and equipment



Duration: 2hrs



Practical Activity 1.4.1: Cleaning workplace, tools and equipment



Notes to the trainer

- The trainer is supposed to demonstrate how to clean workplace, tools and equipment
- For the effective delivery, it is recommended to avail workplace, tools and equipment to be cleaned



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to clean workplace, tools and equipment used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to clean workplace, tools and equipment. While demonstrating, explain the procedures.

Step 4: Ask trainees to clean workplace, tools and equipment and monitor the procedures.

Step 5: Verify whether workplace, tools and equipment are well cleaned, and provide feedback where necessary.

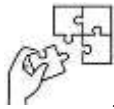
Step 6: Ask trainees to read key reading 1.4.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 1.4



Points to Remember

- Remember that dry cleaning is a method of cleaning where water is not involved while wet cleaning is a method of cleaning where water, liquid solutions and sanitizers are involved.



Application of learning 1.4.

Ask learners to go in meat processing workshop to clean workplace, tools and equipment used in sausage and meat ball making.

Criteria	Indicator	Score	
		Yes	No
Workplace, tools and equipment are effectively cleaned	1.1 Wet cleaning method is applied		
	1.2 Dry cleaning method is applied		
	1.3 Cleaning steps are respected		



Indicative content 1.5: Arrange workplace for sausage and meat ball making



Duration: 2hrs



Theoretical Activity 1.5.1: Description of workplace arrangement



Notes to the trainer:

- Trainer may use small groups to describe workplace arrangement.
- The use of chart or videos to describe workplace arrangement 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. Is it important to arrange workplace? Why?
- II. What do you know about SOPs and processing line as criteria to consider while you are arranging workplace?

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.5.1 in trainee manual.



Points to Remember

- SOPs is written document which has purpose of ensuring that all tools and equipment are properly cleaned and sanitized to prevent contamination and maintain product quality
- Raw materials handling, processing, packaging, and storage are the main parts which including all activities of making sausage and meat ball in processing line.



Practical Activity 1.5.2: Checking the cleanliness of workplace

Notes to the trainer

- The trainer is supposed to demonstrate how to check the cleanliness of workplace
- For the effective delivery, it is recommended to clean the workplace which will be used to check the cleanliness effectiveness.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to check the cleanliness of workplace.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to check the cleanliness of workplace. While demonstrating, explain the procedures.

Step 4: Ask trainees to check the cleanliness of workplace and monitor the procedures.

Step 5: Verify whether cleanliness is well checked and provide feedback where necessary.

Step 6: Ask trainees to read key reading 1.5.2 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 1.5.



Points to Remember

- If any residues or contaminants are found during testing using vision inspection, the affected area should be cleaned again.
- Re-inspect the area using vision inspection after re-cleaning to ensure that it meets cleanliness standards.
- If the pH test indicates the presence of residues, repeat the cleaning and rinsing procedures for the affected areas.
- Re-test the surface until the pH readings falls within the acceptable neutral range
- Re-cleaning the area If a colour change is observed by phenolphthalein, the area should be re-cleaned to remove the remaining alkaline residue.
- Repeat the phenolphthalein test to confirm that the residue has been successfully removed on the re-cleaned area.



Application of learning 1.5.

Ask learners to visit any sausage and meat ball making workshop nearby your school to observe their processing line and how they check cleanliness of workplace, produce visit report.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Field visit report is well done	1.1 Trainee identification is mentioned		
		1.2 Company identification is mentioned		
		1.3 Key competencies gained are described		
		1.4 Recommendations are mentioned		
2	Processing lines are well observed	2.1 Processing line of meat ball is observed		
		2.2 Processing line of sausage is observed		
3	Cleanliness of workplace are well checked	3.1 Vision inspection is tested		
		3.2 pH test is performed		
		3.3 Phenolphthalein test is performed		



Learning outcome 1 end assessment

Written assessment

Q1. Fill the following statements with appropriate tools or equipment from the given list (**mops, sweepers, meat mincer, sausage stuffer, meat ball forming machine, freezer, oven, washing machine**)

- a)are used for cleaning and drying floors in the processing area

Answer: mops

- b)are used to remove dry debris such as dust, crumbs, or small pieces of meat from floors.

Answer: sweepers

- c) is a specialized equipment that forces meat scraps under high pressure along a horizontally mounted cylinder with sharp-edged ribs through a series of holes in a perforated plate.

Answer: meat mincer

- d) are used for filling all types of meat batter in containers such as casings, glass jars and cans.

Answer: sausage stuffer

- e)is suitable for forming all kinds of meatball, into ball-shape products

Answer: meat ball forming 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. **True**
- b) It is important to follow user manuals while you are adjusting tools or equipment. **True**
- c) Wearing appropriate Personal Protective Equipment (PPE) isn't crucial while you are using tools and equipment. **False**
- d) Hands-on selection or physically handle and assess different tools and equipment is a third step of selecting tools and equipment. **False**
- e) Water is referred as universal solvent, and this is the prime agent in cleaning process. However, though an excellent solvent, water alone is not an effective cleaner. **True**

Q3. Circle the answer to the following statements.

- a) The following are selection criteria of cleaning products except:
- i. Food contact surfaces
 - ii. Solubility of cleaning agents
 - iii. Safety
 - iv. Cleaning methods

- v. Beef body fat

Answer:

V. beef body fat

b) The following are classes of ingredients used in making sausage and meat ball except:

- i. Meat ingredient
- ii. Non-meat ingredients
- iii. Sugar
- iv. Preservatives
- v. Potassium sorbate

Answer:

iv. Sugar

c) The following are packaging materials used to package meat ball except:

- i. Paperboard Boxes
- ii. Aluminium foil containers
- iii. Rigid Packaging
- iv. Polypropylene
- v. Plastic Trays with Lidding Film

Answer:

iii. Rigid Packaging

d) The following are the importance of cleaning workplace except

- i. It helps to maintain Food safety standard
- ii. It helps in workflow optimization
- iii. I help to prevent hazards
- iv. It helps to maintain the well-being of employee
- v. It helps to increase the dirty in the workplace

Answer:

V. It helps to increase the dirty in the workplace

Q4. Match the following workplace cleanliness checking tests which is in column A with it's results interpretation which is in column B.

Answers	column A	column B
1.....	1. Vision inspection	a. If any residues or contaminants are found during the inspection, the affected area should be cleaned again following the appropriate procedures.
2.....	2. pH test	b. If a colour change is observed, the area should be re-cleaned to remove the remaining alkaline residue

3.....	3. Phenolphthalein test	c. May indicate that acidic or alkaline residues are still present, need for additional rinsing or cleaning
--------	-------------------------	---

Answer:

Answers
1.a
2.c
3.b

Practical assessment

Ask learner to go in school workshop to prepare the workplace, tools and equipment used in making sausage and meat ball. all resources needed are available in the workshop.

Task 1: Select cleaning products, tools and equipment used in sausage and meat ball making

Task2: Adjust tools and equipment.

Task 3: Clean the workplace, tools and equipment

Task 4: Check the cleanliness of the workplace (test using vision inspection, pH and phenolphthalein)

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Cleaning products, tools and equipment are properly selected	Cleaning products are selected		
		Tools are selected		
		Equipment is selected		
2	Tools and equipment are appropriately adjusted	Tools are adjusted		
		Equipment is adjusted		
3	Workplace, tools and equipment are well cleaned	Workplace are cleaned		
		Tools are cleaned		
		Equipment is cleaned		
4	Cleanliness of workplace are	Vision inspection is used		
		pH test is used		

	correctly checked	Phenolphthalein is used		
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END



Further information to the trainer

Hidayat, S. I., Indah, P. N., Hayati, M. Z. D., & Diana, L. (2018, December). Consumer preferences in purchasing packaged meatball products. In International Conference on Science and Technology (ICST 2018) (pp. 594-603). Atlantis Press.

Ranken, M. D. (2000). Handbook of meat product technology (Vol. 246). Oxford: Blackwell science.

Sharma, R., Choudhary, A., & Thakur, A. K. (2021). Industrial Training at Magbro Healthcare Pvt. Ltd.

Varalakshmi, K. (2016). Cost Benefit analysis of Emulsion meat products. International Journal of Marketing and Technology, 6(3), 58-83.

Weiss, J., Gibis, M., Schuh, V., & Salminen, H. (2010). Advances in ingredient and processing systems for meat and meat products. Meat science, 86(1), 196-213.

YÖRÜK, N. G., & GÜNER, A. (2017). Control of fermented sausage, salami, sausage, and hamburger meatballs produced in meat production facilities applying the ISO Food Security System for food pathogens. Turkish Journal of Veterinary & Animal Sciences, 41(3), 337-344.

Learning Outcome 2: Prepare Ingredients



Indicative contents

2.1 Raw Meat Ingredient Preparation

2.2 Non-Meat Ingredient Preparation

2.3 Casing Preparation

2.4 Mixing Ingredients for Sausage and Meatballs

2.5 Grinding Mixed Ingredients for Sausage and Meat Ball

Key Competencies for Learning Outcome 2: Prepare Ingredients

Knowledge	Skills	Attitudes
• Description of trimming the raw meat used to make sausage and meat ball. • Description of deboning the raw meat used to make sausage and meat ball. • Description of washing raw meat used in making sausage and meat ball. • Description of non-meat ingredients used to make sausage and meat ball. • Description of casings used in making sausage. • Description of mixing ingredients used in sausage and meat ball making. • Description of grinding ingredients used in sausage and meat ball making.	• Trimming raw meat for making sausage and meat ball • Deboning the meat for making sausage and meat ball • Washing raw meat for making sausage and meat ball • Chopping the meat for making sausage and meat ball • Preparing casings used in making sausage • Preserving the casings used in making sausage • Mixing ingredients for making sausage and meat ball • Grinding ingredients for making sausage and meat ball	• Being careful when trimming, deboning, washing, and chopping raw meat. • Being careful when preparing casings. • Being accurate when mixing and grinding ingredients.



Duration: 20hrs

Learning outcome 2 objectives:



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

1. Trim properly raw meat used in making sausage and meat ball according to the trimming techniques.
2. Debone properly raw meat used in making sausage and meat ball according to the deboning procedures.
3. Wash properly raw meat used in making sausage and meat ball according to the washing techniques.
4. Chop appropriately meat used in making sausage and meat ball according to the chopping procedures.
5. Prepare properly non-meat ingredients used in making sausage and meat ball according to the preparation steps.
6. Describe clearly casings used in making sausage according to the casing types.
7. Prepare properly casings used in making sausage according to the casing preparation procedures.
8. Preserve properly casings used in making sausage according to the preserving techniques.
9. Mix properly ingredients used in making sausage and meat ball according to the mixing techniques.
10. Grind properly ingredients used in making sausage and meat ball according to the grinding techniques



Resources

Equipment	Tools	Materials
• Meat deboner • Meat Trimmer • Meat Chopper • Washing Machine • Meat mincer/grinder • Mixing Machine	• Knives • Basket • Basin • Cutting Board • Dust Bin	• Raw Meat • Water • Ascorbate • Phosphates • Soy Products • Cinnamon • Cumin • White Pepper

		• Black Pepper • Mustard Powder • Curry Powder • Onion, Garlic • Potassium Nitrate • Sodium Glutamate • Butylated Hydroxyl Toluene (BHT) • Tocopherols • Hand Gloves • Face Mask • Hair Cover • Sanitizer (Alcohol) • Casings
 Advance Preparation: Before delivering this learning outcome, you are recommended to: • Avail a classroom and workshop. • Avail materials, tools and equipment and make sure that they are in good working condition and verify if they are not expired. • Prepare teaching aids and didactic materials (manuals/guides, task sheets, photos, audio-visuals, protocols)		



Indicative content 2.1: Raw meat ingredient preparation



Duration: 6hrs



Practical Activity 2.1.1: Trimming raw meat used in making sausage and meat ball



- The trainer is supposed to demonstrate how to trim raw meat used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail raw meat to be trimmed



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to trim raw meat used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to trim raw meat. While demonstrating, explain the procedures.

Step 4: Ask trainees to trim raw meat and monitor the procedures.

Step 5: Verify whether raw meat is well trimmed and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.1.1 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.1.



Points to Remember

- The main purpose of trimming is to removing excess fat, connective tissue, and other undesirable parts from meat.
- Using sharpen knife for effective trimming.



Practical Activity 2.1.2: Deboning the meat used in making sausage and meat ball

Notes to the trainer

- The trainer is supposed to demonstrate how to debone raw meat used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail raw meat to be deboned



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to debone raw meat used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to debone raw meat. While demonstrating, explain the procedures.

Step 4: Ask trainees to debone raw meat and monitor the procedures.

Step 5: Verify whether raw meat is well deboned and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.1.2 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.1



Points to Remember

- The main purpose of deboning the meat is to remove the bones from a cut of meat to produce boneless meat portions.
- You are recommended to use Sharp Boning Knife while you are deboning



Practical Activity 2.1.3: Washing raw meat used in making sausage and meat ball

Notes to the trainer

- The trainer is supposed to demonstrate how to wash raw meat used in making sausage and meat ball.

- For the effective delivery, it is recommended to avail raw meat to be washed



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to wash raw meat used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to wash raw meat. While demonstrating, explain the procedures.

Step 4: Ask trainees to wash raw meat and monitor the procedures.

Step 5: Verify whether raw meat is well washed and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.1.3 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.1.



Points to Remember

- The main purpose of washing raw meat is to make it clear out of any residuals which can cause contamination.
- Use hygienic water while you are washing for ensuring effectiveness.
- You are recommended to wash meat until the rinsing water used become clear which indicate that the meat is well cleaned.



Practical Activity 2.1.4: Chopping raw meat used in making sausage and meat ball



Notes to the trainer

- The trainer is supposed to demonstrate how to chop raw meat used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail raw meat to be chopped



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to chop raw meat used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to chop raw meat. While demonstrating, explain the procedures.

Step 4: Ask trainees to chop raw meat and monitor the procedures.

Step 5: Verify whether raw meat is well chopped and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.1.4 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.1



Points to Remember

- Chopping of meat involves cutting the meat into small pieces using a sharp knife or a meat chopper/grinder.
- You are recommended to sharpen the knife and blade of meat grinder before chopping the meat.
- Chopping with a meat grinder according to the manufacturer's instructions.



Application of learning 2.1.

As a technician in Preparation of sausages and meat ball ingredients, you are asked to go in your school workshop to prepare raw meat used in making sausage and meat ball.

Checklist

Criteria	Indicator	Score	
		Yes	No
Raw meat is properly prepared.	1.1 Trimming is done		
	1.2 Deboning is done		
	1.3 Washing is done		
	1.4 Chopping is done		



Indicative content 2.2: Non-meat ingredient preparation



Duration: 1hr



Practical Activity 2.2.1: Preparing of non-meat ingredients



Notes to the trainer

- The trainer is supposed to demonstrate how to prepare non-meat ingredients used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail non-meat ingredients to be prepared.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to prepare non-meat ingredients used in sausage and meat ball making.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to prepare non-meat ingredients. While demonstrating, explain the procedures.

Step 4: Ask trainees to prepare non-meat ingredients and monitor the procedures.

Step 5: Verify whether non-meat ingredients is well prepared and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.2.1 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.2.



Points to Remember

- Non-meat ingredients must be prepared properly following the main steps such as: sorting, weighing, washing, and chopping.



Application of learning 2.2.

As a technician in Preparation of sausages and meat ball ingredients, you are asked to go in your school workshop to prepare non-meat ingredients for making sausage and meat ball which will be used in celebration of school anniversary.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Non-meat ingredients are properly prepared	Sorting is done		
		Weighing is done		
		Washing is done		
		Chopping is done		



Indicative content 2.3: Casing preparation



Duration: 7hrs



Theoretical Activity 2.3.1: Description of casings used in making sausage



Notes to the trainer:

- Trainer may use small groups to describe on casings used in making sausage.
- 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 any type of casing that can be used in sausage making.
- ii. During selection some casings can be rejected due to their defects, what do you suggest about those defects?
- iii. While selecting casing many factors are considered. Which factors do you think/~~know~~?

Step 2: Monitor discussions in groups and ask trainees to write their findings on papers, flip chart, blackboard, or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key readings 2.3.1. in trainee manual



Points to Remember

- Natural casing made from the intestines of animals, typically pigs, sheep or cows.
- Artificial casings made from materials such as cellulose, collagen or plastic



Practical Activity 2.3.2: Preparing casings and applying casing preserving techniques used in making sausage



Notes to the trainer

- The trainer is supposed to demonstrate how to prepare and preserve casings used in making sausage.
- For the effective delivery, it is recommended to avail casings to be prepared and preserved.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to prepare and preserve casings used in sausage.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to prepare and preserve casings. While demonstrating, explain the procedures.

Step 4: Ask trainees to prepare and preserve casings and monitor the procedures.

Step 5: Verify whether casings are well prepared and preserved and provide feedback where necessary.

Step 6: Ask trainees to read key reading 2.3.2 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.3.



Points to Remember

- Prepare natural casings by soaking it in water, flushing it inside and storing it properly
- Collagen and cellulose casings are ready to use after proper storage.
- Note that you are recommended to peel off cellulose casing before consumption while for natural you can consume the whole product without peeling the casing.
- Prepare brine solution with ratio of 1:10 salt to water for salt curing.
- Smoke casings for 2-3 hrs then after cool and store it in cool dry place.



Application of learning 2.3.

As a technician in Preparation of sausages casings, you are asked to go in your school workshop to flush soaked natural casings and storing them by using salt curing method.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Natural casings are well prepared	Flushing is done		
		Storing is done		
		Salt curing method is used		



Indicative content 2.4: Mixing ingredients for sausage and meatballs



Duration: 3hrs



Practical Activity 2.4.1: Mixing the ingredients used in making sausage and meat ball



Notes to the trainer

- The trainer is supposed to demonstrate how to mix ingredients used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail the ingredients to be mixed



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to mix the ingredients used in making sausage and meat ball.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to mix the ingredients. While demonstrating, explain the procedures.

Step 4: Ask trainees to mix the ingredients and monitor the procedures.

Step 5: Verify whether the ingredients are well mixed and provide feedback where necessary.

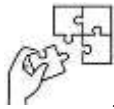
Step 6: Ask trainees to read key reading 2.4.1 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.4.



Points to Remember

- Avoid overmixing ingredients which can lead to a loss of texture and tenderness.



Application of learning 2.4.

As a technician in Preparation of sausages and meat ball ingredients, you are asked to go in your school workshop to mix ingredients used in making sausage and meat ball.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Mixing of ingredients are properly done	Ingredients ratio is respected		
		Mixing technique is applied		
		Ingredients are well mixed		



Indicative content 2.5: Grinding mixed ingredients for sausage and meat ball



Duration: 3hrs



Practical Activity 2.5.1: Grinding the ingredients used in making sausage and meat ball



Notes to the trainer

- The trainer is supposed to demonstrate how to grind the mixed ingredients used in making sausage and meat ball.
- For the effective delivery, it is recommended to avail the mixed ingredients to be ground.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to grind the mixed ingredients used in making sausage and meat ball.

Step 2: Explain the task and provide clear work instruction (Task, PPE, Time allocated)

Step 3: Demonstrate how to grind the mixed ingredients. While demonstrating, explain the procedures.

Step 4: Ask trainees to grind the mixed ingredients and monitor the procedures.

Step 5: Verify whether the mixed ingredients are well ground and provide feedback where necessary.

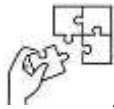
Step 6: Ask trainees to read key reading 2.5.1 in trainee manual.

Step 7: Ask trainees to perform the task provided in application of learning 2.5



Points to Remember

- Fine grinding refers to grinding ingredients to a fine size using plate hole size of **3-4mm**
- Coarse grinding refers to grinding ingredients to a rough or medium-rough finish using plate hole size of **8-12 mm**.



Application of learning 2.5

As a technician in Preparation of sausages and meat ball ingredients, you are asked to go in your school meat workshop to grind mixed ingredients used in making sausage and meat ball.

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Grinding mixed ingredients are well done	Fine grinding is achieved		
		Coarse grinding is achieved		



Learning outcome 2 end assessment

Written assessment

Q1. Fill the following statement with terms from the given list (trimming, deboning, washing, chopping, grinding**)**

- a) It involves..... the meat to a fine texture, which enhances the flavour, texture, and overall quality of the final product.

Answer: grinding

- b) can be done manually using a knife or with the help of a blender for larger quantities.

Answer: chopping

- c) also helps to enhance food safety by reducing the risk of bacterial contamination.

Answer: washing

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

- a) Meat trimming refers to the process of removing excess fat, connective tissue, and other undesirable parts from meat. **true**
- b) Deboning raw meat refers to the process of removing the fat from a cut of meat to produce boneless meat portions. **false**
- c) The size of the meat pieces will affect the texture and consistency of the final product. **True**
- d) Small holes in the casing can result from mishandling, excessive pressure during stuffing, or sharp objects. These holes can lead to leakage of filling or moisture loss during cooking. **true**
- e) Switch to a finer grinder plate (3-4 mm holes) and pass the meat through the grinder again to achieve a finer texture for fine grinding. **true**

Q3. Circle the answer to the following statements

- a) The procedures of coarse grinding techniques are the following except:
- i. Chill the ingredients
 - ii. Pre-cut the meat
 - iii. Select the grinder plate of 8-12 mm
 - iv. Grind the meat
 - v. Mix the other ingredients
 - vi. Chopping the ingredients

Answer:

vi. Chopping the ingredients

- b) The procedures of natural casings preparation are the following except:
- i. Soaking casings in cold water 20°C for 12hrs

- ii. Flushing the casings with running water
- iii. Storing casings in 15 to 20% salt solution
- iv. Smoking for 30 hrs

Answer:

iv. Smoking for 30 hrs

c) The purpose of deboning the meat are the following except:

- I. Provide uniform Flavour
- II. Enhance Binding capacity
- III. Enhanced Safety
- IV. Improved Appearance
- V. Increase the viscosity of mixture

Answer:

- v. Increase the viscosity of mixture

Q4. Match the following steps of preparing non-meat ingredients which is in column A with it's explanation which is in column B

Answers	column A	column B
1.....	1. Sorting	a. It involves cutting the ingredients into small, uniform pieces to ensure even distribution throughout the mixture.
2.....	2. Weighing	b. Helps to enhance food safety by reducing the risk of bacterial contamination.
3.....	3. Washing	c. This step ensures that the recipe's proportions are maintained, resulting in consistent flavour and texture
4.....	4. chopping	d. This step is important to eliminate any potential contaminants that could affect the taste or texture of the sausages or meatballs

Answer:

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

Practical assessment

As a technician in Preparation of sausages and meat ball ingredients-you are asked to go in your workshop to prepare meat and non-meat ingredients used in making sausage and meat ball. all resources needed are available in the workshop.

Task 1: Trim, debone, wash and chop the meat used in sausage and meat ball making

Task2: Sort, weigh, wash and chop non-meat ingredients used in sausage and meat ball making.

Task 3: Prepare the natural casings used in sausage and meat ball making

Task 4: Mix the ingredients used in sausage and meat ball making

Task 5: Grind the ingredients used in sausage and meat ball making

Checklist

SN	Criteria	Indicator	Score	
			Yes	No
1	Meat ingredients are properly prepared	Trimming is done		
		Deboning is done		
		Washing is done		
		Chopping is done		
		Grinding is done		
		Mixing is done		
		Natural casing is prepared		
2	Non-meat ingredients are properly prepared	Sorting is done		
		Weighing is done		
		Washing is done		
		Chopping is done		

END



Further information to the trainer

Liu, L., Kerry, J. F., & Kerry, J. P. (2007). Application and assessment of extruded edible casings manufactured from pectin and gelatin/sodium alginate blends for use with breakfast pork sausage. *Meat Science*, 75(2), 196-202.

Petersson, K., Godard, O., Eliasson, A. C., & Tornberg, E. (2014). The effects of cereal additives in low-fat sausages and meatballs. Part 2: Rye bran, oat bran and barley fibre. *Meat science*, 96(1), 503-508.

Weiss, J., Gibis, M., Schuh, V., & Salminen, H. (2010). Advances in ingredient and processing systems for meat and meat products. *Meat science*, 86(1), 196-213.

Wu, Y. C., Chi, S. P., & Christieans, S. (2014). Casings. *Handbook of fermented meat and poultry*, 89-96.

Xiong, Y. L. (2012). Nonmeat ingredients and additives. *Handbook of meat and meat processing*, 573-588.

Yang, S., Angulo, F. J., & Altekruuse, S. F. (2000). Evaluation of safe food-handling instructions on raw meat and poultry products. *Journal of food protection*, 63(10), 1321-1325.

Learning Outcome 3: Mould the Sausage and Meat Ball



Indicative contents

3.1 Shaping of meat ball

3.2 Stuffing ground ingredients into casing

3.3 Tying and linking sausage

Key Competencies for Learning Outcome3: Mould the Sausage and Meat Ball

Knowledge	Skills	Attitudes
N/A	• Shaping ground meat into meat ball • Stuffing ground ingredients into casing • Tying and linking the sausage	• Being precise while shaping meat balls • Being careful while stuffing ground ingredients into casing • Paying attention while tying and linking the sausage



Duration: 10 hrs

Learning outcome 3 objectives:



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

1. Shape properly the meat ball according to the shaping procedures
2. Stuff properly the ground ingredients into casing according to the stuffing techniques
3. Tie and link appropriately the sausage according to the procedures



Resources

Equipment	Tools	Materials
• Meat ball moulder, • Stuffer and clipping machine • Tables	• Cutting knives • Cutting board • Trolley • Receiving bowl	• Natural casing • Artificial casing • Twine needles • Hand gloves • Face mask • Hair cover • Sanitizer (alcohol)



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

In the classroom, where theoretically activities will be conducted, the trainer must:

- Prepare a detailed lesson plan that outlines the key concepts that will be covered in the session.
- Gather all necessary teaching materials, such as handouts, Power Point presentations, images and videos.
- Prepare the classroom environment to ensure that it is clean, safe, and well-organized.
- Set clear learning objectives for the session and communicate them to the trainees.
- In the workshop, where practical activities will be conducted, the trainer must:
- Secure all necessary equipment and supplies, such as glove, scooper, bowls and so on.
- Ensure that the workshop environment is clean, safe, and well-organized.
- Develop a step-by-step plan for shaping meat balls, stuffing ground ingredients into casing and tying and linking demonstrations.
- Identify any potential hazards and develop mitigation strategies



Indicative content 3.1: Shaping the meat balls



Duration: 3hrs



Practical Activity 3.1.1: Shaping the meat balls



Notes to the trainer

- Allow trainees to go to the processing work shop, and ask them to shape the meat ball.
- For the effective delivery; it is recommended to avail the ground ingredients



Key steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to shape the meat balls

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to shape the meat ball. While demonstrating, explain the procedures.

Step 4: Ask trainees to shape meat ball and monitor the procedures.

Step 5: Verify whether meat balls are well shaped, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 3.1.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 3.1



Points to Remember

- Different purposes of shaping meat balls are; even cooking, portion control, Enhanced flavor, versatility, aesthetic appeal, good presentation and cooking and eating satisfaction
- Meat ball shaping can be done by rolling method (spoon shaping and meat ball pan) and by meat ball maker



Application of learning 3.1.

During the parent's committee meeting at your school, ask trainees to shape 20 pieces of meat ball made from ground beef meat for serving them at lunch time. Each piece should weight 80 grams. After shaping, ask them to show you shaped meat ball before further processing.

Solution:

SN	Criteria	Indicator	Yes	No
1	Ground mixture is well formed into meatball	1.1. Meat ball is shaped		
		1.2. Meat ball number is respected		
		1.3. Meat ball weight is respected		



Indicative content 3.2: Stuffing ground ingredients into casing



Duration: 4 hrs



Practical Activity 3.2.1: Stuffing the ground ingredients into casing



Notes to the trainer

- Allow trainees to go to the processing work shop and ask them to stuff ground ingredients of sausage into casing.



Key steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to stuff ground ingredients of sausage into casing.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to stuff the ingredients into casings. While demonstrating, explain the procedures.

Step 4: Ask trainees to stuff ground ingredients into casing and monitor the procedures.

Step 5: Verify whether ground ingredients is well stuffed, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 3.2.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 3.2



Points to Remember

- Stuffing techniques for sausage are manual stuffing technique and mechanical stuffing method.
- For manual stuffing technique, we can use funnel or stuffing horn, while for mechanical stuffing technique we can use stuffing machine (stuffer).



Application of learning 3.2.

During the parent's committee meeting at your school, order the trainees to stuff 1 kg of ground beef meat into natural casing in order to make sausage for serving them at lunch time. After stuffing, ask them to show you stuffed meat before further processing.

Checklist:

SN	Criteria	Indicator	Yes	No
1	Ground mixture is well stuffed into casings according to the standards	1.1.Stuffing size is respected		
		1.2.Ground mixture are stuffed		
		1.3.Casings stuffing procedure is followed		



Indicative content 3.3: Tying and linking sausage



Duration: 3 hrs



Practical Activity 3.3.1: Tying and linking the sausage



Notes to the trainer

- Allow trainees to go to the processing work shop and ask them to tie and link the sausage.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to tie and link sausage.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to tie and link sausage. While demonstrating, explain the procedures.

Step 4: Ask trainees to tie and link sausage and monitor the procedures.

Step 5: Verify whether the sausage is well tied and linked, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 3.3.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 3.3



Points to Remember

- Tying and linking the sausage are done by using a butcher thread
- Tying the sausage can be done by twisting, pinching and clipping techniques
- Linking sausage can be done by tying technique, twisting technique and by using sausage linker



Application of learning 3.3.

During the parent's committee meeting held at your school, ordered your trainees to tie and link above stuffed meat into 20 sausage units for serving them at lunch time. After tying and linking, ask them to show you tied and linked sausages before further processing.

Solution:

SN	Criteria	Indicator	Yes	No
	Sausage is well linked according to the size requirements	1.1. The equal size of sausage is respected		
		1.2. Sausages are tied		
		1.3. Sausages are linked		



Learning outcome 3 end assessment

Written assessment

Q1. After reading and understanding the statements below, circle the right answer

- a) The following are not the purpose of shaping meat ball except:
- i. **It ensures that the meat cooks evenly on all sides**
 - ii. It helps to fill meat ingredients into a container
 - iii. It helps to make meat mixture very tender after being cooked
 - iv. It helps to build the body
 - v. It helps in development of meat
- b) A good shape for meat ball should be:
- i. Spherical shape
 - ii. Round shape
 - iii. Oval shape
 - iv. **All above are correct**
 - v. None is correct
- c) The following tools are used in meat ball shaping except:
- i. Funnel
 - ii. Spoon
 - iii. Scooper
 - iv. **Saucepan**

Q2. Read careful the following statements and answer by True if is correct or answer by False if is incorrect:

- i. Sausage tying refers to the process of securing the ends of the sausage casing to prevent the filling from spilling out during cooking or handling. **True**
- ii. Double twisting in sausage making means that the casing is twisted together to form a knot **False**
- iii. Sausage stuffing refers to the process of filling a casing with a meat mixture. **True**
- iv. Hand Stuffing involves filling the casing with meat using stuffing horn fixed on a stuffer **False**

Q3. Fill in the gap space with the words in brackets (stuffing horn, sausage clipper, spherical shape)

- i. During stuffing of ground meat, the casing is attached to the....., and the machine is started (**stuffing horn**)
- ii.Is a specialized tool used to cut and seal the casing simultaneously. (**sausage clipper**)

- iii. The helps to concentrate the flavors within the meatball, resulting in a more intense taste experience. (**spherical shape**)

Practical assessment

In TVET School's Food Processing Workshop, a trainer ordered you to make 20 pieces of sausage and 20 pieces of meat ball to serve for visitors during the parent's committee meeting. The meat should be 2 kgs of beef type and casing should be natural and should be done in 2 hours

You are requested to:

- Shape meat ball of 80 grams within 1 kg of ground meat
- Stuff ground meat into casing within 1 kg of ground meat
- Link/tie the sausage; each unit should be 20 cm long.

SN	Criteria	Indicator	Yes	No
1	Ground mixture is well formed into meatball according to the product specifications	1.1. Meat ball is shaped		
		1.2. Meat ball weight is respected		
2	Ground mixture is well stuffed into casings according to the standards	2.1. Stuffing size is respected		
		2.2. Ground mixture are stuffed		
		2.3. Casings stuffing procedure is followed		
		2.4. Stuffing process is monitored		
3	Sausage is well linked according to the size requirements	3.1. The equal size of sausage is respected		
		3.2. Sausages are linked		
		3.3. Sausages are tied		

END



Further information to the trainer

Desvita, H., Faisal, M., Mahidin & Suhendrayatna (2020). Preservation of meatballs with edible co-ating of chitosan dissolved in rice hull-based liquid smoke. Heliyon, 6, e05228. 10.1016/j.heliyon. 2020.e05228

Hasheider, Philip, 1951- The complete book of butchering, smoking, curing, and sausage making: how to harvest your livestock & wild game / Philip Hasheider. - 1st ed. p.cm.

Michael ruhlman; Brian polcyn; Thomas Keller, charcuterie: the craft of salting, smoking, and curing, w.w. Norton& company; first edition (November 21,2005)

Reynolds and Schuler. 1982. Sausage and Smoked Meat. Georgia: Cooperative Extension Service, the University of Georgia. 30p.

Rust, Robert. 1977. Sausage and Processed Meats Manufacturing. Washington D. C.: AMI Center for Continuing Education, American Meat Institute. 153p.

Learning Outcome 4: Preserve the Sausage and Meat Ball



Indicative contents

4.1 Cooking, drying and smoking of the sausage and meat ball

4.2 Checking quality of the processed sausage and meat ball

4.3 Storing of the sausage and meat ball

Key Competencies for Learning Outcome 4: Preserve the Sausage and Meat Ball

Knowledge	Skills	Attitudes
• Explanation of the purposes of cooking and cooling sausage and meatball • Description of smoking the sausage • Identification of the purposes and conditions of drying the sausage • Description of quality parameters of processed sausage and meat balls • Identification of purpose of labelling and labelling information of sausage and meat ball • Description of storage conditions of sausage and meat balls	• Cooking the sausage and meat ball • Smoking the sausage • Cooling the sausage and meat ball • Drying the sausage • Checking the quality of processed sausage and meat ball • Packaging processed sausage and meat balls • Labelling packaged sausage and meat ball	• Being careful while cooking, drying and smoking sausage and meat ball • Being attentive while drying the sausage • Being honest while checking the quality • Being careful when packaging and labelling the sausage and meat ball



Duration: 20 hrs

Learning outcome 4 objectives:



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

1. Explain correctly the purposes of cooking and cooling sausage and meatball
2. Cook appropriately sausage and meat ball according to cooking methods
3. Describe correctly smoking of the sausage according to the smoking materials
4. Smoke appropriately the sausage according to the smoking techniques
5. Cool appropriately sausage and meat ball according to cooling methods
6. Identify correctly the purposes and conditions of drying the sausage
7. Dry appropriately sausage according to drying conditions
8. Describe correctly quality parameters processed sausage and meat ball
9. Check effectively the quality of processed sausage and meat ball
10. Identify correctly the purpose of labelling and labelling information of sausage and meat ball
11. Package appropriately processed sausage and meat balls according to packaging techniques
12. Label appropriately packaged sausage and meat ball according to the labelling techniques
13. Describe correctly storage conditions used in sausage and meat ball Store sausage and meat ball



Resources

Equipment	Tools	Materials
● Stove ● Fryer ● Smoke House ● Smoking Machine ● Drying Incubator ● Water Sprayer ● Air Sprayer ● Refrigerator ● Working table	● Thermometer ● Hanging Racks ● Hygrometer ● Moisture Meter ● pH- Meter ● Timer	● Fire Wood ● Charcoal Pieces ● Dust Wood ● Vegetable Oil ● Water



Advance Preparation:

Before delivering this learning outcome, you are recommended to:

In the classroom, where theoretically activities will be conducted, the trainer must:

- Prepare a detailed lesson plan that outlines the key concepts that will be covered in the session.
- Gather all necessary teaching materials, such as handouts, Power Point presentations, images and videos.
- Prepare the classroom environment to ensure that it is clean, safe, and well-organized.
- Set clear learning objectives for the session and communicate them to the trainees.

In the workshop, where practical activities will be conducted, the trainer must:

- Secure all necessary equipment and supplies, fryer, oven, air sprayer, water sprayer, thermometers, ...
- Ensure that the workshop environment is clean, safe, and well-organized.
- Develop a step-by-step plan for cooking and smoking.
Identify any potential hazards and develop mitigation strategies.



Indicative content 4.1: Cooking, drying and smoking of the sausage and meat ball



Duration: 10 hrs



Practical Activity 4.1.1: Cooking the sausage and meat ball



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and ask them to cook sausage and meat ball.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to cook sausage and meat ball

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to cook sausage and meat ball. While demonstrating, explain the procedures.

Step 4: Ask trainees to cook sausage and meatball and monitor the procedures.

Step 5: Verify whether sausages and meat balls are well cooked, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.1.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.1



Points to Remember

- During cooking sausage, use boiling, frying, grilling and baking methods.
- During baking sausage and meat ball, a baking temperature of 375°F (191°C) is maintained.
- Frying of sausage and meat ball is done within 5-7 minutes per side at 350-375°F (177-191°C) to become brown.
- During grilling sausage and meat ball, a grilling temperature of (about 400-450°F or 200-230°C) is maintained.

- The recommended internal cooking temperature for both sausage and meatballs is **160°F (71°C)**.



Theoretical Activity 4.1.2: Description of smoking the sausage



Notes to the trainer:

- Trainer may use small groups and ask them to describe the smoking of sausage.
- While delivering you can use pictures and videos as didactic materials.



Key steps:

While delivering this activity, pass through the following steps:

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

- i. How can you define the term smoking as used in sausage making?
- ii. Give any component of smoke you know

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 4.1.2 in trainee manual



Points to Remember

- The beneficial components of smoke during smoking sausage are phenols and resins that play role in preservation.
- During preservation, phenols act as antioxidant, antimicrobial and flavour enhancer



Practical Activity 4.1.3: Smoking the sausage



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and ask them to smoke the sausage.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to smoke the sausage

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step3: Demonstrate how to smoke the sausage. While demonstrating, explain the procedures.

Step 4: Ask trainees to smoke the sausage and monitor the procedures.

Step 5: Verify whether sausages are well smoked, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.1.3 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.1



Points to Remember

- During smoking sausages, a smoker temperature of 225-250°F (107-121°C) is maintained.



Practical Activity 4.1.4: Cooling the sausage and meat ball



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and ask them to cool the sausage and meat ball.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to cool the sausage and meat ball

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to cool the sausage and meat ball. While demonstrating, explain the procedures.

Step 4: Ask trainees to cool the sausage and meat ball and monitor the procedures.

Step 5: Verify whether sausages and meat ball are well cooled, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.1.4 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.1



Points to Remember

- During cooling sausage and meat ball, use ice bath, refrigerator and cold water cooling methods.



Practical Activity 4.1.5: Drying the sausage



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and ask them to dry the sausage.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to dry the sausage.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to dry the sausage. While demonstrating, explain the procedures.

Step 4: Ask trainees to dry the sausage and monitor the procedures.

Step 5: Verify whether sausages are well dried, and provide feedback where necessary.

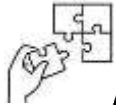
Step 6: Ask trainees to read key reading 4.1.5 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.1



Points to Remember

- During drying sausage, use a dehydrator or drying rack techniques
- The optimum drying temperature for sausage is 75-85°F (24-29°C)
- The recommended internal temperature for dried sausage is 160°F (71°C).



Application of learning 4.1.

During the parent's committee meeting held at your school, order the trainees to fry 10 pieces of sausage and meat ball and to bake remaining 10 sausage and meat ball for serving them at lunch time. After cooking them, ask them to show you the sausage and meat ball before further processing.

Checklist:

SN	Criteria	Indicator	Yes	No
1	Sausage and meatball are properly cooked	1.1. Sausages are baked		
		1.2. Meat balls are fried		
		1.3. Number of baked sausages is respected		
		1.4. Number of meat balls is respected		



Indicative content 4.2: Checking quality of the processed sausage and meat ball



Duration: 3 hrs



Theoretical Activity 4.2.1: Identification of quality parameters of processed sausage and meat ball



Notes to the trainer:

- Trainer may use small groups to identify the quality parameters of processed sausage and meat ball
- The use of image or videos to identify the quality parameters of processed sausage and meat ball 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 predict as about sensory qualities of processed sausage and meat ball?
- ii. What do you predict about physical qualities of processed sausage and meat ball?

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 4.2.1. in trainee manual



Points to Remember

- Different sensory qualities of processed sausage and meat ball are grouped into taste and aroma
- Different physical qualities of processed sausage and meat ball are shape, texture, appearance and size.



Practical Activity 4.2.2: Checking the quality of the processed sausage and meat ball



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and assign the trainees to check sensory and physical qualities of sausage and meat ball.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to check the quality of processed sausage and meat ball.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to check the quality. While demonstrating, explain the procedures.

Step 4: Ask trainees to check the quality of the processed sausage and meat ball.

Step 5: Verify whether sausages and meat ball quality are well checked, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.2.2 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.2



Points to Remember

- Sensory qualities are tested by tasting (taking a small bite) to the sausage and meat ball
- Physical qualities are tested by vision inspection and touch test for sausage and meat ball



Application of learning 4.2.

During the parent's committee meeting held at your school, ask trainees to check sensory qualities of cooked sausage and meat ball to be served to the guests. After checking, ask testing results from the trainees.

Checklist:

SN	Criteria	Indicator	Yes	No
1	Quality of the sausage and meatball is properly checked	1.1 Sausage is not shrinked		
		1.2 Sausage is not too oil		
		1.3 Meatballs are not busted		
		1.4 Meatballs are not burnt		
		1.5 Meatballs are not too moist		
		1.6 Sausage is not salty		
		1.7 Meatballs are not salty		



Indicative content 4.3: Storing of the sausage and meat ball



Duration: 7hrs



Practical Activity 4.3.1: Packaging the sausage and meat ball



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and assign the trainees to package the sausage and meat ball.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to package the sausage and meat ball.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to package the sausage and meat ball. While demonstrating, explain the procedures.

Step 4: Ask trainees to package the sausage and meat ball.

Step 5: Verify whether sausages and meat ball are well packaged, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.3.1 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.3



Points to Remember

- The main purpose of packaging sausage and meat ball is to preserve freshness
- The packaging materials for sausage and meat ball are plastics, paper and foil
- During sausage and meat ball packaging, use Vacuum sealing, Modified atmosphere packaging, Blister packaging and Shrink wrapping sealing techniques



Practical Activity 4.3.2: Labeling the sausage and meat ball



Notes to the trainer

- Allow trainees to go to the processing work shop where this activity is going to take place, and assign the trainees to label the sausage and meat ball.



Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to go in meat processing workshop to label the sausage and meat ball.

Step 2: Explain the task and provide clear work instruction (PPE, Time allocated)

Step 3: Demonstrate how to label the sausage and meat ball. While demonstrating, explain the procedures.

Step 4: Ask trainees to label the sausage and meat ball.

Step 5: Verify whether sausages and meat ball are well labelled, and provide feedback where necessary.

Step 6: Ask trainees to read key reading 4.3.2 in trainee manual

Step 7: Ask trainees to perform the task provided in application of learning 4.3



Points to Remember

- Labelling on packaged sausage and meat ball is crucial to provide essential information of product
- During labelling, use direct and indirect labeling techniques



Theoretical Activity 4.3.3: Description of storage condition



Notes to the trainer:

- Trainer may use small groups to describe the storage condition of sausage and meat ball
- 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 any storage condition required for sausage and meat ball storage

Step 2: Ask trainees to write their findings on papers, flip chart, blackboard or white board.

Step 3: Asks trainees to present the findings.

Step 4: Provide the expert view and clarify ideas by using didactic materials.

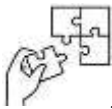
Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 4.3.3. in trainee manual



Points to Remember

- Storage conditions for sausage and meat ball are temperature and hygiene
- Cooked sausage and meat ball can be stored in refrigeration condition, chilling conditions or freezing conditions.



Application of learning 4.3.

During the parent's committee meeting held at your school, ask trainees to package, to label and to store sausage and meat ball before being served to the guests. After that, ask the trainees to show you stored products.

Checklist:

SN	Criteria	Indicator	Yes	No
1	Sausage and meatball are appropriately stored in accordance with the meat product requirement.	1.1. Sausage are packed		
		1.2. Meatballs are packed		
		1.3. Labelling information are respected		
		1.4. Storage conditions of are respected		



Learning outcome 4 end assessment

Written assessment

Q1. Choose the correct answer for the following statements

- a) The following are cooking methods for meat ball, except;
 - i. Baking
 - ii. Frying
 - iii. **Steaming**
- b) The internal temperature for cooked sausage and meat ball is;
 - i. 180-200°F (82-93°C)
 - ii. 375°F (191°C)
 - iii. **160°F (71°C).**
- c) Sensory qualities of sausage and meat ball are checked by testing;
 - i. Texture
 - ii. **Smokiness**
 - iii. Shape

Q2. Fill in the gaps with the words provided in brackets (harmful bacteria, Phenols, **Smokiness**, **MAP**, refrigeration)

- a) **Phenols** are the primary chemical components in smoke that contribute to the preservation of meat
- b) Cooking sausage thoroughly helps to kill **harmful bacteria** that may be present in the raw meat.
- c) **Smokiness** is a common flavor profile, especially in sausages that have been smoked.
- d) **MAP** is a technique that involves replacing the air in the package with a mixture of gases, such as nitrogen, carbon dioxide, and oxygen
- e) The ideal **refrigeration** conditions for stored fresh meat products are a temperature of 40°F (4°C) or below

Q3. Answer by True or False for the following statements

- a) The ideal chilling conditions for stored fresh meat products are a temperature of 40°F (4°C) or below (**False**)
- b) Labelling is often required by law to protect public health and prevent fraud (**True**)
- c) During drying doneness, Sausages are done when they are firm to the touch and have a moist exterior (**False**)

Practical assessment

In TVET School's Food Processing Workshop, a trainer ordered you to cook 20 pieces of sausage and 20 pieces of meat ball to serve for visitors during the parent's committee meeting. The sausage should be tied and linked while meat balls are round shaped.

As a qualified processor, you are requested to:

- Package the sausage and meat ball
- Each pack should contain 4 pieces
- Label all packaged products accordingly
- Store the packaged product at refrigeration conditions

SN	Criteria	Indicators	Yes	No
1	Sausage and meatball are cooked /dried/ smoked/cooled according to the requirement	1.1 Sausage and meat ball are baked		
		1.2 Number of baked sausage and meat ball is respected		
2	Quality of the sausage and meatball is properly checked according to the meat processing requirement.	2.1 Sausage is not shrinked		
		2.2 Sausage is not too oil		
		2.3 Meatballs are not busted		
		2.4 Meatballs are not burnt		
		2.5 Meatballs are not too moist		
		2.6 Sausage is not salty		
		2.7 Meatballs are not salty		
3	Sausage and meatball are appropriately stored in accordance with the meat product requirement.	3.1 Sausage are packed		
		3.2 Meatballs are packed		
		3.3 Labelling information are respected		
		3.4 Storage conditions of are respected		

END



Further information to the trainer

Sausage operations. 3/9/2020. Further Processing and Labelling Inspection Course.

Rust, Robert. 1977. Sausage and Processed Meats Manufacturing. Washington D. C.: AMI Center for Continuing Education, American Meat Institute. 153p.

Fidel toldr, handbook of meat processing, wiley-blackwell;1 edition (April 20,2010)



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