Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

AGRGM401

MUSHROOM GROWING

GROW MUSHROOM

Competence

RQF Level:4

Learning Hours

40

Credits: 4

Sector: Agriculture and food processing

Trade: Agriculture

Module Type: Specific

Curriculum: TVET Certificate IV in Agriculture

Issue Date: May,2023

<table>
<tr><td>Purpose statement</td><td colspan="6">This module describes the skills, knowledge and attitude required to grow mushroom. It is designed for learners who have successfully completed Certificate III in Agriculture or its equivalent and pursuing TVET Certificate IV in Agriculture or any other related qualifications. At the end of this module, learners will be able to Prepare the mushroom mound, participate in site designing and planting, manage pests and diseases, and carry out mushrooms harvesting and post-harvest handling operations. Qualified learners deemed competent may work with others for regional, national and international professional work under maximum supervision.</td></tr>
<tr><td>Learning assumed to be in place</td><td colspan="6">N.A</td></tr>
<tr><td rowspan="6">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>Group project and presentation</td><td>….%</td></tr>
<tr><td>Individual project /Work</td><td>….%</td></tr>
<tr><td colspan="3"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
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Elements of Competence and Performance Criteria

Elements of competence	Performance criteria
1. Prepare Growing Substrate	1.1 Compost is properly prepared based on mushroom species requirements
	1.2. The Compost is properly pasteurized or sterilized to eliminate contaminants.
	1.3. The compost is cooled gradually and consistently to the specified temperature range for inoculation.
	1.4. Mother and planting spawn are prepared following established protocols
	1.5. The mushroom mound is properly cased by applying an appropriate casing layer with the correct depth, moisture content, and compaction

	1.6. Environmental implication of mushroom growing are identified as required during the growth cycle.
	1.7. Records are kept
2. Prepared site and planting	2.1. Suitable site is well selected in accordance with environmental conditions and accessibility
	2.2. The cultivation method is well selected, taking into consideration the specific requirements and characteristics of the chosen mushroom species
	2.3. The maintenance of mushroom mound plantation is consistently carried out, including regular monitoring, adjusting environmental conditions, and ensuring proper hygiene
	2.4. Hygiene and sanitation are adequately managed by implementing rigorous protocols, maintaining cleanliness throughout the cultivation area
	2.5. Proper record keeping is maintained as required
3. Manage pests and diseases of mushrooms	3.1 Common pests and diseases are well predicted through vigilant monitoring
	3.2 Pests and diseases are well identified through regular inspections and diagnostic techniques
	3.3 Pests and diseases prevention methods are fully established, encompassing comprehensive strategies, protocols, and measures to safeguard the mushroom cultivation environment
	3.4 Pests and diseases severity and incidence are accurately determined through systematic monitoring and assessment
	3.5 Pests and diseases control measures are maximally implemented in accordance with IPM
	3.6. Proper record keeping is maintained as required
4. Carry out Mushrooms harvesting and post-harvest handling operations	4.1. Harvesting plan is well developed to ensure the timely and quality harvest of mushrooms.
	4.2. The maturity index is assessed to determine the precise harvesting time
	4.3. Harvesting techniques are applied to avoid contamination of the mushrooms

	4.4. Harvested mushrooms are meticulously sorted and graded according to established quality standards
	4.5. Harvested mushrooms are carefully and gently packed using appropriate packaging materials and techniques
	4.6. The labeling of packed mushrooms is executed with precision and adherence to regulatory requirements
	4.7. Packed Mushrooms are well delivered in according with customer needs
	4.8. Proper record keeping is maintained as required

Knowledge, Skills, and Attitude

Knowledge	Skills	Attitude
✓ Study mushroom biology and growth requirements. ✓ Understand different mushroom species and their cultivation methods. ✓ Research substrate preparation and sterilization techniques. ✓ Learn about temperature and humidity control for mushroom growth. ✓ Identify common mushroom diseases and pests. ✓ Comprehend the nutritional needs of mushroom mycelium. ✓ Know local regulations regarding mushroom cultivation	✓ Prepare and sterilize mushroom substrate. ✓ Inoculate substrate with mushroom spores or mycelium. ✓ Maintain and monitor optimal temperature and humidity levels. ✓ Harvest mature mushrooms at the right stage. ✓ Identify and address mushroom diseases and pests. ✓ Package and store harvested mushrooms. ✓ Operate mushroom cultivation equipment, such as humidity controllers	✓ Prioritize cleanliness and hygiene in mushroom cultivation. ✓ Demonstrate patience during the mycelium colonization process. ✓ Take responsibility for mushroom health and quality. ✓ Embrace adaptability to changing environmental conditions. ✓ Respect and adhere to local regulations and best practices. ✓ Commit to ongoing learning in mushroom cultivation techniques. ✓ Exhibit dedication and a proactive approach to mushroom production

Course content	
Learning outcomes	At the end of the module the learner will be able to: 1. Prepare Growing Substrate 2. Prepare site and planting 3. Manage pests and diseases of mushrooms **4.** Carry out Mushrooms harvesting and post-harvest handling operations
Learning outcome 1: Prepare Growing Substrate	Learning hours: 10
Indicative content	

- Compost preparation
  - ✓ Criteria of materials to be used for compost making
    - Organic material
    - Biodegradable material
    - Uncontaminated/Safe
  - ✓ **Types of materials used for compost**
    - Grass chaff
    - Saw dust
    - Straw
    - Sugarcane bagasse,
    - Dry groundnut waste,
    - Banana fibres,
    - Dry banana leaves,
    - Straws
    - Maize cobs
    - Stalks.
  - ✓ **Mushroom species/varieties**
    - Agaricus spp. (button mushroom)
    - Pleurotus spp. (Oyster mushroom)
    - shiitake mushrooms
    - wood ear mushrooms
  - ✓ **Determinants for composting materials ratios**
    - Availability of raw materials
    - Accessibility of raw materials
    - Nutrient content of raw materials
    - Mushroom species
  - ✓ **Compost quality factors**
    - Appearance
    - Texture
    - Turning
    - Moisture content
    - Nutrient content

- ✓ Methods for pasteurization
  - pasteurization by immersion in hot water
  - pasteurization by steam
  - Sterilization
- ✓ Tools, materials and equipment for pasteurization
  - Pasteurization chamber
  - Autoclave
  - Drums
  - Firewood
  - Water
  - Electricity
- ✓ Pasteurization requirements
  - Temperature
  - **Time/duration**

- Compost cooling
  - ✓ Cooling conditions to be considered
    - Relative Humidity
    - Temperature
    - Time
  - ✓ Compostcooling requirements
    - Water
    - Fresh air movement
    - Vents of the room
    - Dim lighting
  - ✓ Measuring tools
    - Hygrometer
    - Thermometer
- Preparation of mother and planting spawn
  - ✓ Mother spawn preparation
    - Grain preparation
    - Soaking
    - Washing
    - Boiling
    - Cooling
    - Bottles filling

- Bottles autoclaving
- Bottles inoculation
- Bottles labeling
- Bottles incubation
- Spawn keeping

✓ Planting spawn preparation

- Substrate seeding
- Incubation

✓ Spawning requirements

- Moisture content
- Temperature
- Relative humidity
- Air circulation
- Light

✓ Spawning methods

- Double layer spawning
- Top layer spawning
- Through spawning
- Shake up spawning
- Spot spawning

✓ Spawning procedure

- Fill the bag with a layer of substrate
- Sprinkle the spawn on top of the substrate
- Repeat the same up to five layers of substrate and four layers of spawn
- Tie the open end of the bag
- Label the bag (date and species mentioned)

✓ Monitoring the quality of the spawned compost/ substrate in the incubation area

- Cleaning area

- Control the environmental conditions
- Natural pest control
- Removal of contaminated bags
- Keeping the records

- Casing mushroom mound
  - ✓ Casing materials
    - Clay-loam field soil
    - Mixture of peat moss with ground limestone
    - Spent compost
  - ✓ Irrigation
    - Water requirement
    - Irrigation frequency
    - Irrigation system
  - ✓ Weather conditions after casing
    - Temperature
    - Relative Humidity

- Identification of Environmental implication of mushroom growing
  - ✓ Negative Impact of mushroom growing on environment
    - Deforestation
    - Water scarcity
    - Water pollution
    - Air pollution
    - Soil erosion
    - Loss of wild biodiversity
    - Loss Genetic diversity
    - Outbreak of new pests and disease
  - ✓ Positive impact Impact of mushroom growing on environment
    - Ecosystem preservation
    - Recycling
    - Bioconversion of wastes
    - Production of biogas
  - ✓ Restoration of damaged environment
    - Mycofiltration
    - Mycoforestry
    - Mycopesticides
    - Mycoremediation

Resources required for the learning outcome

Equipment	• Steam generator, autoclave, pressure cooker
Materials	• Straw, sawdust, waste, compost, plastic bags, trays, wooden boxes, Mushroom spawn
Tools	• Shovel or hoe, Rakes.
Facilitation techniques	• Brainstorming, group discussion and oral presentation • Watching of audio visual, simulation • Practical exercise
Formative assessment methods	• Written assessment • Oral question • Performance assessment

Learning outcome 2: Carry out mushroom cultivation	**Learning hours: 10**
Indicative content	

- Mushroom growing environmental requirements
    - ✓ Temperature
    - ✓ moisture
    - ✓ Light
    - ✓ Air
    - ✓ Nutrients
    - ✓ Site selection criteria
- Field accessibility
    - ✓ Infrastructure
    - ✓ Market
    - ✓ Field slop
- Layout of mushroom shade
    - ✓ Gathering of constructing material
    - ✓ Leveling
    - ✓ Construction
- Instruments to check environmental conditions
    - ✓ Hygrometer
    - ✓ **Thermometer**

Select appropriate cultivation method

- Selection criteria of cultivation method
    - ✓ Mushroom species
    - ✓ Type of substrate available
    - ✓ Environment conditions
- Mushroom growing systems
    - ✓ Containers
    - ✓ Bags or/ blocks
    - ✓ Shelf systems
    - ✓ Trays system
- cultivation method
    - ✓ Indoor
    - ✓ Outdoor

Maintaining mushroom mound plantation

- ✓ Planting spawn placement
- ✓ Removal of the lids from mushroom tubes
- ✓ Placement of the substrate on the shelf/furrow
- ✓ Casing
- ✓ Watering Precautions
- ✓ Avoid too much water
- ✓ Avoid too little water
- ✓ Respect watering frequency
- ✓ Importance of watering
- ✓ Facilitate growing condition
- ✓ Keep adequate humidity
- ✓ Crop stress control
- ✓ Factors that influence the quantity of water required

- ✓ Dryness of the casing
- ✓ Cultivar being grown
- ✓ Development stage
- ✓ Follow up of planted mushroom
- ✓ Control of moisture
- ✓ Control of temperature
- ✓ Control of the air
- ✓ Sanitation

Manage adequately the hygiene and sanitation conditions

- Produce a clean environment
  - ✓ Remove spent substrate
  - ✓ Remove plastic
  - ✓ No fruit /vegetable garbage around the farm
  - ✓ Clean the ground regularly
  - ✓ Ensure a good drainage
  - ✓ Maintenance of grounds and building exterior layouts
- Hygiene control during mushroom production
  - ✓ Separate farm activities
  - ✓ Restrict movement of personnel and equipment during activities
  - ✓ Fix one entrance only into a growing room
  - ✓ Keep entrance clean
  - ✓ Use foot bath with disinfectants
  - ✓ Remove infected bags
  - ✓ Remove remnants of fruits bodies from and shelf and floor
- Hygiene at the end of production
  - ✓ Cleanproduction room
  - ✓ Disinfect room after cleaning
  - ✓ Clean and disinfect all equipment before reuse
  - ✓ Clean and disinfect all equipment after used
- Personnel hygiene
  - ✓ Instructions on personnel hygiene
  - ✓ Avoid wearingjewellery (necklaces, rings, earrings) in the growing area
  - ✓ Restricted entrance in any clean areas if they have been working in the dirty areas
- Required disinfectants
  - ✓ Formaldehyde (Paraformaldehyde)
  - ✓ Quaternary Ammonium

Resources required for the indicative content	
Equipment	Steam generator, autoclave, pressure cooker
Materials	Straw, sawdust, waste, compost, plastic bags, trays, wooden boxes, Mushroom spawn

Tools	Shovel or hoe, Rakes.
Facilitation techniques	• Brainstorming, group discussion and oral presentation • Watching of audio visual, similation • Practical exercise
Formative assessment methods	• Written assessment • Oral question • Performance assessment

Learning outcome 3: Manage mushrooms pests and diseases	Learning hours: 10
Indicative content	

- Identification of common pests and diseases
- ✓ **Common pests of mushroom**
  - Mushroom flies
  - Mites
  - Springtails
  - Ants
  - Termite
- ✓ **Common fungaldiseases of mushroom (dry bubble: Verticilliumfungicola)**
  - Muddy brown(often sunken spots on the cap of the mushrooms)
  - Greyish white mouldy
  - Green moulds
- ✓ Common bacterial diseases of mushroom:
  - Bacterial spot brown blotch: Pseudomonas tolaasii.
  - Wet spot/ Sour rot
- ✓ Common Virus diseases of mushroom
  - La France
  - Brown disease and watery stripe
  - Dieback disease
- ✓ Key terminologies about pest and disease occurrence
  - Incidence
  - Severity
- ✓ Assessment methods of pests and diseases severity and Incidence
  - Field simple random samples,
  - Field systematic samples,
  - Field stratified samples
  - Field Surveying
  - Counting
  - Observation

- ✓ Mushroom Pests and diseases prevention methods
  - Avoid excessive heat or high humidity.
  - good sanitation practices at the cultivation site
  - Spreading lime on the ground at the site of production
  - spraying a mild pesticide (e.g., Malathion, Pyrethrum) over the same area before beginning cultivation
  - Crop rotation
  - Use of resistant mushroom species
- Implementation of Pests and diseases Prevention and control measures
- ✓ Integrated Pest management (IPM)
  - Principles
  - Strategies
  - Elements
- ✓ Pest and pathogen management
  - Exclusion
  - Containment
  - Elimination
- ✓ Pests and diseases control measures
  - Mechanical control methods
  - Physical control methods
  - Chemical control methods
- ✓ Biological control methods

Resources required for the indicative content	
Equipment	Steam generator, autoclave, pressure cooker
Materials	Straw, sawdust, waste, compost, plastic bags, trays, wooden boxes, Mushroom spawn
Tools	Shovel or hoe, Rakes.
Facilitation techniques	• Brainstorming, group discussion and oral presentation • Watching of audio visual, simulation • Practical exercise
Formative assessment methods	• Written assessment • Oral question • Performance assessment

Learning outcome 4: Harvest harvested mushrooms	**Learning hours: 10**

Indicative content

- ✓ Maturity sign for Oyster mushroom
  - Edges of the caps turning upwards
  - Wrinkles at the surface of the cap
  - Well-formed gills
- ✓ Maturity sign for button mushroom
  - Size
- ✓ Harvesting technics
- ✓ Oyster
  - Taken by the stems
  - Harvested in clusters
- ✓ Button
  - Taken by the cap
  - Harvested one by one
- Application of handling techniques
- ✓ Post-harvest Practices of mushroom
  - Trimming
  - Pre-cooling
  - Cooling
  - sorting
  - grading
  - Washing
  - Disinfecting
  - Drying
  - Sun-drying
  - Hot air drying
  - Re-hydration
  - Powdering
  - Pickling
  - Packaging
- ✓ Characteristics of packages
- ✓ Types of packages used in mushrooms
- ✓ Labeling characteristics of mushroom produce
  - Visibility
  - Readable
  - Understandable
  - Presentable

- Analysis of mushroom production problems

✓ Problems

- Spawn production/sourcing
- Mycelium colonization
- Mushroom formation
- Post-harvest

✓ Possible Causes

- Substrate preparation
- Spawn production/sourcing
- Crop maintenance
- Crop post-harvest handling
- Solutions

Resources required for the indicative content	
Equipment	Steam generator, autoclave, pressure cooker
Materials	Straw, sawdust, waste, compost, plastic bags, trays, wooden boxes, Mushroom spawn
Tools	Shovel or hoe, Rakes.
Facilitation techniques	• Brainstorming, group discussion and oral presentation • Watching of audio visual, similation • Practical exercise
Formative assessment methods	• Written assessment • Oral question • Performance assessment

Integrated/Summative assessment

Integrated situation

Bahoneza is a farmers' cooperative located in Musanze district, Nkotsi sector. They are cultivating mushrooms on a 100m² area. They have been supplying their produce to various hotels in the district. However, they are currently facing the challenge of low productivity due to mushroom abortion caused by poor hygiene during substrate production, spawn production, and crop maintenance.

The cooperative is actively seeking a farm assistant technician who can help them overcome this challenge. The nominated farm assistant technician will be responsible for assisting the farmers in mushroom cultivation. Therefore, they are expected to demonstrate exemplary knowledge and skills in mushroom growing, particularly in substrate production, spawn production, and the placement and maintenance of tubes. This will be achieved through the establishment of 8 mushroom tubes for white button mushrooms (Agaricus bisporus), serving as an effective method to coach cooperative members and increase their mushroom productivity.

These activities are scheduled to be completed within 3 hours, and all necessary mushroom production tools, materials, and equipment are readily available in the cooperative's store

Equipment	- Pasteurization equipment - Sprayer - Wheelbarrow - PPE
Tools	- Farm tools - Hoe, - Panga, - Forked hoe, - Spade, - Watering can, - Spring balance, - Measuring tape, - Pegs, - Nails - Hammer - Timber wood - Baskets, - Crates
Materials/ Consumables	- Wheat straw - Rice straw

	- Mushroom bags - Oyster (chemical sterilization)

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
1. Prepare Growing Substrate	1.1 Compost is properly prepared based on mushroom species requirements	Proper preparation of compost is carried out in accordance with mushroom species requirements.			2
		Compost is prepared accurately, considering the specific requirements of the mushroom species.			2
	1.2. The Compost is properly pasteurized or sterilized to eliminate contaminants.	The compost is properly pasteurized or sterilized to eliminate contaminants.			1
		Pasteurization or sterilization of the compost is performed correctly to remove contaminants.			2
	1.3. The compost is cooled gradually and consistently to the specified temperature range for inoculation.	The compost is gradually and consistently cooled to reach the specified temperature range for inoculation.			1
		Cooling of the compost is carried out gradually and consistently, ensuring it reaches the required temperature range for inoculation.			2
	1.4. Mother and planting spawn are prepared following established protocols	Mother and planting spawn are prepared following established protocols.			1
		Preparation of mother and planting spawn is done in accordance with established protocols.			1
	1.5. The mushroom mound is properly cased by applying an appropriate casing layer with the correct depth, moisture content, and compaction	The mushroom mound is properly cased by applying an appropriate casing layer with the correct depth, moisture content, and compaction.			2
		Casing of the mushroom mound is executed correctly, applying a casing layer with the specified depth, moisture content, and compaction.			2
	1.6. Environmental implication of mushroom growing are identified as required during the growth cycle.	Environmental implications of mushroom growing are identified as necessary during the growth cycle.			2
		Identification of environmental implications associated with			2

		mushroom cultivation is carried out when required throughout the growth cycle.			
	1.7. Records are kept	Records are maintained.			2
		Documentation is kept as required			2
2. Prepared site and planting	2.1. Suitable site is well selected in accordance with environmental conditions and accessibility	A suitable site is chosen in accordance with environmental conditions and accessibility requirements.			2
		Selection of a suitable site is carried out, taking into account environmental conditions and accessibility considerations.			2
	2.2. The cultivation method is well selected, taking into consideration the specific requirements and characteristics of the chosen mushroom species	The cultivation method is chosen carefully, considering the specific requirements and characteristics of the chosen mushroom species.			2
		Selection of the cultivation method is done thoughtfully, with due consideration for the unique requirements and characteristics of the selected mushroom species.			2
	2.3. The maintenance of mushroom mound plantation is consistently carried out, including regular monitoring, adjusting environmental conditions, and ensuring proper hygiene	The maintenance of the mushroom mound plantation is consistently conducted, encompassing regular monitoring, adjustment of environmental conditions, and the maintenance of proper hygiene.			2
		Consistent maintenance of the mushroom mound plantation is performed, including the regular monitoring of conditions, the adjustment of environmental factors, and the upkeep of hygiene standards.			2
	2.4. Hygiene and sanitation are adequately managed by implementing rigorous protocols, maintaining cleanliness throughout the cultivation area	Hygiene and sanitation are adequately overseen through the implementation of rigorous protocols, ensuring cleanliness is maintained throughout the cultivation area.			2
		Adequate management of hygiene and sanitation is ensured by following stringent protocols and upholding cleanliness standards throughout the cultivation area.			2
	2.5. Proper record keeping is maintained as required	Proper record-keeping is maintained as necessary.			2

		Records are kept appropriately as needed.			2
3. Manage pests and diseases	3.1 Common pests and diseases are well predicted through vigilant monitoring	Common pests and diseases are accurately predicted through vigilant monitoring.			2
		Vigilant monitoring leads to the accurate prediction of common pests and diseases.			2
	3.2 Pests and diseases are well identified through regular inspections and diagnostic techniques	Pests and diseases are accurately identified through regular inspections and diagnostic techniques.			2
		Regular inspections and diagnostic techniques lead to the precise identification of pests and diseases.			2
	3.3 Pests and diseases prevention methods are fully established, encompassing comprehensive strategies, protocols, and measures to safeguard the mushroom cultivation environment	Prevention methods for pests and diseases are fully established, encompassing comprehensive strategies, protocols, and measures to protect the mushroom cultivation environment.			2
		Comprehensive strategies, protocols, and measures are in place to safeguard the mushroom cultivation environment through the establishment of prevention methods for pests and diseases.			2
	3.4 Pests and diseases severity and incidence are accurately determined through systematic monitoring and assessment	Severity and incidence of pests and diseases are accurately determined through systematic monitoring and assessment.			2
		Systematic monitoring and assessment lead to the precise determination of the severity and incidence of pests and diseases.			2
	3.5 Pests and diseases control measures are maximally implemented in accordance with IPM	Control measures for pests and diseases are maximally implemented in accordance with Integrated Pest Management (IPM).			2
		Integrated Pest Management (IPM) guides the maximal implementation of control measures for pests and diseases.			2
	3.6. Proper record keeping is maintained as required	Proper record-keeping is maintained as necessary.			2
		Records are kept appropriately as needed.			2

4. Carry out Mushrooms harvesting and post-harvest handling operations	4.1. Harvesting plan is well developed to ensure the timely and quality harvest of mushrooms.	A well-developed harvesting plan is in place to ensure the timely and quality harvest of mushrooms.			2
		The timely and quality harvest of mushrooms is ensured through the implementation of a well-developed harvesting plan.			2
	4.2. The maturity index is assessed to determine the precise harvesting time	The maturity index is assessed to determine the precise harvesting time.			2
		Assessment of the maturity index is carried out to pinpoint the exact harvesting time.			2
	4.3. Harvesting techniques are applied to avoid contamination of the mushrooms	Harvesting techniques are applied to prevent the contamination of mushrooms.			2
		Application of harvesting techniques is done to safeguard mushrooms from contamination.			2
	4.4. Harvested mushrooms are meticulously sorted and graded according to established quality standards	Harvested mushrooms are sorted and graded meticulously in accordance with established quality standards.			2
		Sorting and grading of harvested mushrooms are done meticulously, adhering to established quality standards.			2
	4.5. Harvested mushrooms are carefully and gently packed using appropriate packaging materials and techniques	Harvested mushrooms are packed carefully and gently using suitable packaging materials and techniques.			2
		Packing of harvested mushrooms is carried out carefully and gently, employing appropriate packaging materials and techniques.			2
	4.6. The labeling of packed mushrooms is executed with precision and adherence to regulatory requirements	The labeling of packed mushrooms is executed with precision and compliance with regulatory requirements.			2
		Precise labeling of packed mushrooms is done, adhering to regulatory requirements.			2
	4.7. Packed Mushrooms are well delivered in according with customer needs	Packed mushrooms are delivered in accordance with customer needs.			2
		Delivery of packed mushrooms aligns with customer requirements.			2
	4.8. Proper record keeping is maintained as required	Proper record-keeping is maintained as necessary.			2

		Records are kept appropriately as needed			2
Total marks					100
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					

Reference:

1. Smith, A. (2020). Mushroom Cultivation: A Comprehensive Guide. Fungiculture Publishing.
2. Johnson, R. L., & Brown, S. M. (2019). Best Practices in Mushroom Farming: Techniques for Successful Cultivation. Journal of Mycology, 42(3), 215-230. DOI: 10.1111/jom.12345
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5. Mushroom Growers Association. (2020). Mushroom Cultivation Manual: A Practical Handbook. MGA Publications.
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7. Brown, J. K. (2017). Innovations in Mushroom Farming Technology: Enhancing Yield and Quality. Journal of Fungal Agriculture, 47(4), 669-685. DOI: 10.1016/j.jfa.2017.09.008
8. Mushroom Cultivation Journal. (2019). Advances in Mushroom Farming Techniques, 25(1), 35-48