

## FOOD MICROBIOLOGY

**UNIT CODE:** MED/CU/NUD/CC/03/6/A

### Relationship to Occupational Standards

This unit addresses the unit of competency: demonstrate the knowledge of food microbiological techniques

**Duration of Unit:** 90 hours

### UNIT DESCRIPTION

This unit specifies the competencies required to apply microbiological techniques. It involves demonstrating the knowledge of microorganisms in foods and food environments, physiology, genetics, biochemistry and behaviour of microorganisms, microbiology of food fermentation, micrological aspects of food safety, methods of detection, identification and enumeration of food microorganisms.

### Summary of Learning Outcomes

- 1 Demonstrate the knowledge of microorganisms in food and food environment
- 2 Demonstrate the knowledge of physiology, genetics, biochemistry and behaviour of food microorganisms
- 3 Demonstrate the knowledge of microbiology of food fermentation
- 4 Demonstrate the knowledge of microbiological aspects of food safety
- 5 Demonstrate the knowledge on methods of detection, identification and enumeration of food microorganism

### Learning Outcomes, Content and Suggested Assessment Methods

| Learning Outcome  | Content  | Suggested Assessment Methods  |
|---|--|---|
| 1. Demonstrate the knowledge of microorganisms in food and food environment | <ul style="list-style-type: none"><li>• Meaning of terms in food microbiology</li><li>• Basic types of food microorganism; bacteria, viruses, fungi, protozoa, algae</li><li>• Roles of microorganisms in food safety and spoilage</li><li>• Microscopy; structure, use care and maintenance</li></ul> | <ul style="list-style-type: none"><li>• Written .</li><li>• Observation</li><li>• Third party report</li><li>• Oral questioning</li><li>• Interviews</li><li>• Practicals</li></ul> |
| 2. Demonstrate the knowledge of   | <ul style="list-style-type: none"><li>• Physiology, genetics and biochemistry of microorganisms;</li></ul>   | <ul style="list-style-type: none"><li>• Written .</li><li>• Observation</li></ul>   |

| Learning Outcome  | Content   | Suggested Assessment Methods  |
|---|---|---|
| physiology, genetics, biochemistry and behaviour of food microorganisms | bacteria, fungi, viruses, protozoa, algae <ul style="list-style-type: none"> <li>• Bacterial anatomy: Shapes and arrangement of bacteria, Cell cytology, Bacterial cell arrangement Sporulation, Cocci, bacillus , spiral chains</li> <li>• Factors that influence growth and activity of food microorganism; temperature, time, PH, moisture, water activity The influence of temperature on bacterial physiology and nutrition</li> <li>• The growth pattern of a typical bacterial colony</li> <li>• The gram stain method and AFB test</li> </ul> | <ul style="list-style-type: none"> <li>• Third party report</li> <li>• Oral questioning</li> <li>• Interviews</li> </ul>  |
| 3. Demonstrate the knowledge on microbiology of food fermentation       | <ul style="list-style-type: none"> <li>• Meaning of terms in food fermentation, importance of food fermentation</li> <li>• Microorganisms in fermentation process</li> <li>• Fermentation processes in different types of food; dairy products, grains, meats, fruits and vegetable and bevarages</li> </ul>  | <ul style="list-style-type: none"> <li>• Written .</li> <li>• Observation</li> <li>• Third party report</li> <li>• Oral questioning</li> <li>• Interviews</li> <li>• Practicals in food labs</li> </ul> |
| 4. Demonstrate the knowledge of microbiological aspects of food safety  | <ul style="list-style-type: none"> <li>• Meaning of terms in microbial aspects in food safety</li> <li>• Microbial aspects of food safety: during production, processing and labelling, food handling distribution and storage, food preparation and use</li> </ul>   | <ul style="list-style-type: none"> <li>• Written .</li> <li>• Observation</li> <li>• Third party report</li> <li>• Oral questioning</li> <li>• Interviews</li> <li>• Practicals</li> </ul>              |

| Learning Outcome   | Content   | Suggested Assessment Methods   |
|--|---|--|
| 5. Demonstrate the knowledge on methods of detection, identification and enumeration of food microorganism | <ul style="list-style-type: none"> <li>• Introduction to basic laboratory equipment and materials</li> <li>• Methods of detection, identification and enumeration of microorganisms: staining, culturing, observation of morphology etc</li> <li>•</li> </ul> | <ul style="list-style-type: none"> <li>• Written .</li> <li>• Observation</li> <li>• Third party report</li> <li>• Oral questioning</li> <li>• Interviews</li> <li>• Practicals</li> </ul> |

#### **Suggested Methods of Delivery**

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

#### **Recommended Resources**

1. Labs
2. Cold chains
3. Vaccines
4. Stationery
5. Staining reagents
6. Culture systems

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