

CARRY OUT MICROBIOLOGICAL TECHNIQUES

UNIT CODE: APB/OS/AB/CR/02/6/A

UNIT DESCRIPTION

This unit specifies the competencies required to carry out microbiological techniques. It involves carrying out safety and sterilization, performing culture and bacteria identification, carrying out specimen collection, carrying out antibiotic sensitivity testing and applying food and water microbiology. It also involves applying industrial microbiology, performing mycological techniques and performing virology techniques.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function (to be stated in active)	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements (to be stated in passive voice) <i>Bold and italicized terms are elaborated in the Range</i>
1 Carry out safety and sterilization	1.1 Classes of laboratories are determined as per World Health Organization codes of practice 1.2 Laboratory acquired infections are determined as per laboratory procedures 1.3 Safety precautions in the laboratory are adhered to based on laboratory procedures 1.4 <i>Sterilization methods</i> are determined as per laboratory procedures 1.5 Sterilization is carried out as per laboratory procedures 1.6 <i>Sterility indicators</i> are identified as per laboratory procedures
2 Perform culture and bacteria identification	2.1 <i>Bacterial growth requirements</i> are determined as per laboratory procedures 2.2 <i>Types of culture media</i> are identified as per laboratory procedure 2.3 Media preparation is carried out as per laboratory procedures 2.4 <i>Inoculation methods</i> are determined as per microbiological procedures

	<p>2.5 Inoculation is carried out based on microbiological procedures</p> <p>2.6 Bacterial identification is carried out as per microbiological procedures</p>
3 Carry out specimen collection	<p>3.1 Types of specimen are identified as per laboratory procedures</p> <p>3.2 Specimen is collected based on laboratory procedures</p> <p>3.3 Specimen processing is carried out as per laboratory procedures</p> <p>3.4 Microscopic examination is carried out as per laboratory procedures</p>
4 Carry out antibiotic sensitivity testing	<p>4.1 Classes of antibiotics are identified as per microbiological procedures</p> <p>4.2 Antibiotic sensitivity testing techniques are carried out as per microbiological procedures</p> <p>4.3 Methods of bacterial enumeration are determined as per microbiological procedures</p> <p>4.4 Bacterial enumeration is carried out based on microbiological procedures</p>
5 Apply food and water microbiology	<p>5.1 Water sampling methods are identified as per microbiological procedures</p> <p>5.2 Water sampling is carried out as per microbiological procedures</p> <p>5.3 Causes of water pollution are identified as per laboratory procedures</p> <p>5.4 Water treatment is carried out as per microbiological procedures</p> <p>5.5 Sewage treatment is carried out according to microbiological procedures</p> <p>5.6 Analysis of bacteria in food and water is carried out based on microbiological procedures</p> <p>5.7 Food preservation methods are determined as per laboratory procedures</p>
6 Apply industrial microbiology	<p>6.1 Industrial micro-organisms are determined as per microbiological procedures</p> <p>6.2 Food production processes are carried out as per microbiological procedures</p>

	<p>6.3 Bio-gas production is carried out as per microbiological procedures</p> <p>6.4 Biodegradation is carried out as per laboratory procedures</p>
7 Perform mycological techniques	<p>7.1 Classification of fungi is determined as per laboratory procedures</p> <p>7.2 Growth requirements are determined as per laboratory procedures</p> <p>7.3 Culture and identification of fungi is carried out as per microbiological procedures</p> <p>7.4 Mycotoxins are extracted and identified as per microbiological procedures</p>
8 Perform virology techniques	<p>8.1 Classification of viruses is determined as per microbiological procedures</p> <p>8.2 Structure of viruses is determined as per microbiological procedures</p> <p>8.3 Animal viral diseases are identified as per microbiological procedures</p> <p>8.4 Viral diagnostic techniques are carried out as per microbiological procedures</p>

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

VARIABLE	RANGE
Sterilization methods include but are not limited to:	<ul style="list-style-type: none"> • Dry heat • Moist heat • Radiation • Chemicals
Sterility indicators include but are not limited to:	<ul style="list-style-type: none"> • Autoclave tape • Brownie's tube • Biological control
Bacterial growth requirements include but are not limited to:	<ul style="list-style-type: none"> • Nutrition • Gaseous • Temperature

Types of culture media include but are not limited to:	<ul style="list-style-type: none"> • Solid • Liquid • Basal • Enriched • Selective • Differential • Transport • Storage
Inoculation methods include but are not limited to:	<ul style="list-style-type: none"> • Streaking • Stubbing • Pour plate • Slopes • Deep culture
Bacterial identification includes but are not limited to:	<ul style="list-style-type: none"> • Staining • Cultural characteristics • Biochemical tests
Types of specimen includes but are not limited to:	<ul style="list-style-type: none"> • Pus • Blood • Urine • Stool • Swabs
Specimen processing includes but are not limited to:	<ul style="list-style-type: none"> • Dilution • Culture
Sensitivity testing techniques includes but are not limited to:	<ul style="list-style-type: none"> • Disc diffusion • Dilution methods
Methods of bacterial enumeration include but not limited to:	<ul style="list-style-type: none"> • Most probable number • Tally counters
Food production processes include but not limited to:	<ul style="list-style-type: none"> • Yoghurt making • Beer making
Biodegradation include but not limited to:	<ul style="list-style-type: none"> • Biodeterioration • Bio fragmentation • Assimilation
Classification of viruses include but not limited to:	<ul style="list-style-type: none"> • RNA • DNA

Structure of viruses include but not limited to:	<ul style="list-style-type: none"> • Nucleic acid • Protein coat
Viral diagnostic techniques include but not limited to:	<ul style="list-style-type: none"> • Tissue culture • Cell monolayers • Microscopy

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Maintenance
- Communication
- Interpersonal
- Analytical
- Critical thinking
- Problem solving
- First aid
- Innovation
- Creativity

Required Knowledge

The individual needs to demonstrate knowledge of:

- Sterilization
- Safety
- Culture media
- Viruses
- Fungi
- Bacteria
- Water treatment
- Sewage treatment
- Fermentation
- Nucleic acids
- Antibiotics

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1 Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Carried out safety and sterilization 1.2 Performed culture and bacteria identification 1.3 Carried out specimen collection and processing 1.4 Carried out antibiotic sensitivity testing 1.5 Applied food and water microbiology 1.6 Applied industrial microbiology 1.7 Performed mycological techniques 1.8 Performed virology techniques
2 Resource Implications	The following resources should be provided: 2.1 Functional microbiology laboratory 2.2 Functional laboratory apparatus, equipment and materials 2.3 Microbiology laboratory manuals 2.4 PPEs
3 Methods of Assessment	Competency in this unit may be assessed through: 3.1 Oral 3.2 Written 3.3 Observation 3.4 Third party report 3.5 Practical test
4 Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5 Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.