



Australian Government

MSL975035 Perform microbiological tests

Release: 1

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Modification History

Release	Comments
Release 1	This version was released in <i>MSL Laboratory Operations Training Package Release 2.0</i>. Supersedes and equivalent to MSL975001 Perform microbiological tests. Changes to elements and performance criteria. Foundation skills information added. Range of conditions removed. Assessment requirements amended.

Application

This unit of competency describes the skills and knowledge to contribute to the culture, isolation and identification of microorganisms, such as bacteria, fungi, viruses, protozoans, algae and parasites, in order to investigate the physiology and pathology of plants and animals, monitor the natural environment, and to assist in the production of foods, pharmaceutical goods and other manufactured materials.

This unit applies to laboratory technicians and technical officers working in the biomedical, biotechnology, environmental, manufacturing and food processing industry sectors. The results of work performed by technical personnel would normally be integrated, interpreted and reported on by scientists, medical, veterinary or plant pathologists or other responsible officers in a workplace. Although a supervisor may not always be present, the technician will follow standard operating procedures (SOPs) that will clearly describe the scope of permitted practice in modifying testing procedures, interpreting of data and for communicating test results to people outside the laboratory.

It applies to investigations as well as addressing the broader needs of biotechnology and tissue culture applications.

No licensing or certification requirements exist at the time of publication. However, regulations and/or external accreditation requirements for laboratory operations exist, so local requirements should be checked. Relevant legislation, industry standards and codes of practice within Australia must also be applied.

Pre-requisite Unit

MSL973019 Perform microscopic examination

MSL973016 Perform aseptic techniques

Competency Field

Testing

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|---|-----|--|
| 1 | Receive samples and process associated request forms | 1.1 | Identify specimens and request forms that do not comply with minimum industry requirements for labelling, identification and test requests |
| | | 1.2 | Record any discrepancies and indicate what action is required |
| | | 1.3 | Log samples, recording details that allow accurate tracking and chain of custody |
| 2 | Prepare for safe microbiological work and aseptic applications | 2.1 | Apply principles of aseptic techniques to ensure sample and reagent integrity are maintained |
| | | 2.2 | Apply principles of aseptic techniques to ensure personal and environmental safety |
| | | 2.3 | Minimise the production and release of aerosols, using biological safety cabinets where necessary |
| | | 2.4 | Safely dispose of biohazardous materials and other laboratory wastes in accordance with workplace procedures |
| 3 | Process samples for direct examination | 3.1 | Prepare thin smears of samples for subsequent staining to enable microscopic identification of cells |
| | | 3.2 | Prepare liquid films of specimens for direct observation for motility or cell structure |
| | | 3.3 | Prepare samples to concentrate material for subsequent staining or microscopy |
| 4 | Prepare pure cultures for | 4.1 | Select culture media to maximise growth and optimise production of pure microbial cultures |

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
	microbiological work and aseptic applications	4.2	Inoculate media aseptically, applying techniques suitable for purpose of culture
		4.3	Incubate inoculated media in conditions to optimise growth of organisms and cells
5	Perform procedures that can assist in the identification of microorganisms	5.1	Select staining techniques to demonstrate required cellular characteristics
		5.2	Stain prepared films to demonstrate diagnostically useful characteristics
		5.3	Inoculate and incubate media with pure cultures to assist in the biochemical and immunological identification of microorganisms
		5.4	Microscopic differentiation between, red blood cells, white blood cells, micro-organisms and epithelial cells
		5.5	Select and perform tests on pure cultures to determine the biochemical and immunological identification of microorganisms
		5.6	Perform antibiotic sensitivity testing
6	Estimate the number and/or size of micro-organisms in samples	6.1	Count cells in samples
		6.2	Prepare serial dilutions of samples aseptically for culture and colony counting
		6.3	Indicate the appropriate dilution necessary to reliably count organisms in a serially diluted sample
		6.4	Count colonies for calculating number of viable organisms per unit volume
7	Maintain records of laboratory work	7.1	Record entries on report forms or into a laboratory information management system accurately calculating, recording or transcribing data as required

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 7.2 Ensure traceability of sample from receipt to reporting of results

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

- Oral communication skills to interact effectively with supervisors and managers (laboratory, quality and customer service), personnel in other laboratories in the workplace or in other workplaces to which work may be referred, customers, patients and clients, external auditors and accreditation agencies, such as National Association of Testing Authorities (NATA)
- Problem solving skills to identify artefacts or image aberrations attributable to misalignment or obstruction of light paths or condensers used in microscopy, or with other steps in microscopic examinations.

Other foundation skills essential to performance are explicit in the performance criteria of this unit.

Unit Mapping Information

Equivalent to MSL975001 Perform microbiological tests, Release 1.

Links

Training Package Companion Volumes -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL975035 Perform microbiological tests

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, and:

- identified at least 5 microorganisms to species based on colonial/microscopic morphology, biochemistry and/or immunological characteristics, including:
 - at least 1 identification must be from a mixed culture
 - at least 4 from the following list:
 - Staphylococcus sp.*
 - Streptococcus sp.*
 - Pseudomonas sp.*
 - a member of the Enterobacteriaceae family
 - Clostridium sp.* or another gram positive rod
- safely performed at least 8 microbiological tests/procedures for culturing, isolating, identifying and counting microorganisms, including:
 - consistently and accurately performing and interpreting Gram staining of bacteria
 - using and interpreting common enriched, differential and selective media
 - performing agglutination techniques
 - coagulase testing
 - oxidase testing
 - catalase testing
 - use a biochemical test system with statistical interpretation
 - antibiotic sensitivity testing and interpretation
- not contaminating self, other people, the work area, equipment or the samples or materials under test

- not contaminating media or reagents during manipulations involving the transfer of cultures.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- microbiological terminology, including bacteriology, parasitology, virology and mycology
- disinfection and sterilisation as applied to practical aspects of microbiology
- relationship between sample microscopic and macroscopic appearance and indications of infection/contamination
- microbial diversity and taxonomy
- cell biology and chemistry related to laboratory phenomena, such as growth and isolation of organisms for identification
- sources of infection from food, environment, pharmaceuticals and medical equipment/facilities
- sources of contamination of food, environment, pharmaceuticals and medical equipment/facilities
- microorganisms of importance to job role
- transport and storage requirements for microbiological samples to ensure sample integrity prior and post testing
- the importance of maintaining reference cultures and the use of control in microbiological testing
- technological advances in microbiology including automation for identification, enumeration and sensitivity testing
- procedures and reporting requirements for microbiological spills
- purpose of biochemical test, media types and sensitivity testing implemented (why they are used and what they demonstrate)
- application of molecular and serological testing in microbiology
- importance of genetics in microbiology
- general criteria used for the identification of parasites
- general criteria used for the identification of fungi and yeast
- general criteria used for the identification of virus
- rationale for sample dilution and appropriate dilution selection when preparing materials for enumerating organisms and other pure culture work
- need for accurate identification of sample source (such as body, specimen, process line and field location)
- awareness of environmental sustainability issues as they relate to the work task
- legal, ethical and work health and safety (WHS) requirements specific to the work task including traceability, confidentiality and security requirements of all clinical information, and laboratory data and records.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - a standard microbiology laboratory with relevant samples; reagents; protective and physical containment equipment; sample preparation and storage equipment; test equipment, such as microscopes and counters; and sterilising equipment, such as autoclaves
 - workplace procedures, test methods and equipment manuals.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

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<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>