



Australian Government

FBPFST5006 Apply food microbiological techniques and analysis

Release: 1

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Modification History

Release	Comments
Release 1	This version released with the FBP Food, Beverage and Pharmaceutical Training Package Version 2.0.

Application

This unit of competency describes the skills and knowledge required to perform tests and conduct analysis in a food-based microbiological laboratory. The individual is required to demonstrate deep knowledge in a specific technical area and to design and communicate solutions to sometimes complex problems.

This unit applies to individuals who are responsible for analysing the microbiology of food in food processing operations and who undertake roles in technical management and production management.

No occupational licensing or certification requirements apply to this unit at the time of publication. However, legislative and regulatory requirements for food processing exist, so local requirements must be checked. All work must comply with Australian food safety standards and relevant codes of practice.

Pre-requisite Unit

Nil

Unit Sector

Food science and technology (FST)

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify food poisoning and spoilage bacteria, including methods of control	1.1 Identify the major bacteria responsible for food poisoning and spoilage 1.2 Evaluate the types of processes used in the control of microbial growth in food products

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.3 Determine the effect of a standard food preserving technique over a range of pH on the growth patterns of microbes 1.4 Evaluate the effectiveness of this food preserving technique in controlling food poisoning and spoilage microbes 1.5 Assess the usefulness of this technique as part of process control of food poisoning and spoilage microbes 1.6 Assess compliance with Food Standards Code for food preservation techniques
2. Perform microbiological techniques for the identification of food-borne disease	2.1 Use standard microbiological techniques to identify and enumerate food poisoning and spoilage organisms from a food sample 2.2 Identify the type of toxins produced by the major food pathogens 2.3 Investigate documented food-borne disease outbreaks from the past 2.4 Determine the ramifications of product contamination in terms of public health and product shelf-life quality 2.5 Handle specimens and waste to comply with health and safety in the workplace guidelines
3. Apply the principles of microbiological quality control	3.1 Determine the spoilage patterns of specific foods at different temperatures of storage 3.2 Determine the relationship between spoilage patterns and the growth cycle of the specific food spoilage and poisoning organisms 3.3 Design, implement and evaluate a microbiological quality control program for a specific food in terms of the Food Standards Code 3.4 Determine the importance of plant hygiene and how it can affect the finished product
4. Apply rapid microbiological techniques and other relevant technology for the identification of microbes related to plant hygiene	4.1 Examine the principles of accelerated culture techniques critically 4.2 Identify the relevance of rapid microbiological technology, as related to control of plant hygiene 4.3 Perform a series of tests to determine the adequacy of plant sanitation procedures by rapid microbiological or other techniques
5. Perform techniques involving microbial fermentations	5.1 Identify the types and characteristics of microorganisms used for fermentation within the food industry 5.2 Use standard microbiological techniques to isolate and identify

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	yeasts and bacteria in given food samples 5.3 Perform sub-culturing and pure culture techniques for 'scale up' to 'starter' cultures 5.4 Maintain new culture strains after fermentation using standard techniques
6. Analyse test results and provide recommendations to process controllers or production managers	6.1 Record and collate results of microbiological tests 6.2 Analyse microbiological data and compare with food safety and food processing critical control limits and other parameters 6.3 Establish implications of test results and draw conclusions 6.4 Document test results, conclusions and recommendation, and present to food processing management

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
Reading	- Interpret food safety guidelines, standards and regulations - Interpret documented processes for control of microbial growth in food products
Numeracy	- Maintain and analyse data resulting from microbiological tests - Determine calibration procedures and schedule for test equipment
Interact with others	Clarify the purpose and possible actions to be taken as a result of work-related communications

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
FBPFST5006 Apply food	FDFST5006A Apply food	Updated to meet Standards for Training	Equivalent unit

microbiological techniques and analysis	microbiological techniques and analysis	Packages Minor changes to Performance Criteria to clarify intent Prerequisite removed	
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Links

Companion Volume Implementation Guides are found in VETNet: -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=78b15323-cd38-483e-aad7-1159b570a5c4>

Assessment Requirements for FBPFST5006 Apply food microbiological techniques and analysis

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Performance Evidence

An individual demonstrating competency in this unit must satisfy all of the elements and performance criteria of this unit.

There must be evidence that the individual has applied microbiological techniques to analyse food on at least two occasions, including:

- critically examining the principles of rapid microbiological techniques, including:
 - accelerated culture techniques
 - rapid biochemical tests
 - measurement of total bacteria metabolism
 - measurement of spoilage
 - non-traditional methods
 - automated and mechanised methods
- performing tests to determine the adequacy of plant sanitation procedures, by rapid microbiological or other techniques, including:
 - rinse methods
 - swab methods
 - replica or contact methods
- using standard microbiological techniques to isolate and identify yeasts and bacteria in given food samples
- performing sub-culturing and pure culture techniques for 'scale up' to 'starter' cultures
- maintaining new culture strains after fermentation using standard techniques
- recording, analysing and documenting data, with associated conclusions and recommendations
- ascertaining the effect of a standard food preserving technique on the growth patterns of microbes
- using standard microbiological techniques to identify and enumerate food poisoning and spoilage organisms from a food sample
- determining the ramifications of product contamination in terms of public health and product shelf-life

- ascertaining the spoilage patterns of specific foods at different temperatures of storage
- using industry standard terminology.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:

- processes used in the control of microbial growth in food products
- major bacteria responsible for food poisoning and spoilage
- processes used in the control of microbial growth in food products
- Food Standards Code
- statistical methods for process control, including Viable Count methods
- standard microbiological techniques to identify food poisoning and spoilage organisms
- the importance of plant hygiene and how it can affect the finished product
- microbiological toxins and aflatoxins
- spoilage patterns
- growth cycle of microorganisms in food
- the relationship between spoilage patterns and the growth cycle of the specific food spoilage/poisoning organisms
- microbiological quality control programs
- plant hygiene, including sanitation checks – rinse, swab, contact and rapid methods
- rapid microbiological techniques:
 - accelerated culture techniques
 - rapid biochemical tests
 - measurement of total bacteria metabolism
 - measurement of spoilage
 - non-traditional methods
 - automated and mechanised methods
- the relevance of rapid microbiological technology, as related to control of plant hygiene
- types and characteristics of fermentation microorganisms, including:
 - *Saccharomyces* spp.
 - *Streptococcus* spp.
 - *Lactobacillus* spp.
- standard microbiological techniques to isolate and identify yeasts and bacteria in given food samples
- sub-culturing and pure culture techniques for ‘scale up’ to ‘starter’ cultures
- maintenance of new culture strains after fermentation
- critical control limits and microbiological processes and species in food production
- analysis of microbiological data by comparison with food safety and production standards
- effective data presentation and reporting
- health and safety in the workplace hazards and controls relating to work processes.

Assessment Conditions

Assessment of skills must take place under the following conditions:

- physical conditions:
 - skills must be demonstrated in a workplace setting or an environment that accurately represents a real workplace
- resources, equipment and materials:
 - laboratory and related equipment, manufacturers' advice and operating procedures
 - methods and related software systems for collecting data and calculating yields, efficiencies and material variances appropriate to production environment
- specifications:
 - tests used to report relevant product/process information and recorded results.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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