



Australian Government

# **FBPFST5031 Identify the microbiological and biochemical properties of fermented food and/or beverages**

Release: 1

# FBPFST5031 Identify the microbiological and biochemical properties of fermented food and/or beverages

## Modification History

| Release   | Comments                                                                                       |
|-----------|------------------------------------------------------------------------------------------------|
| Release 1 | This version released with FBP Food, Beverage and Pharmaceutical Training Package Version 3.0. |

## Application

This unit of competency describes the skills and knowledge required to identify the microbiological and chemical properties of fermented food and/or beverages, including the identification of food contamination and spoilage.

This unit applies to individuals who apply technical and theoretical knowledge and who design and communicate solutions to sometimes complex problems.

No 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. Apply the principles of microbiological quality control for successful fermentation | 1.1 Determine the fermentation critical control points (CCPs) for successful fermentation for different fermented food and beverage categories<br>1.2 Identify the indicators of unsuccessful fermentation for different fermented food and beverage categories |

| 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 correct microbiological quality control program for specific fermented food and beverage in terms of the Food Standards Code                                                                                                                                                                                                                                                                                                                |
| 2. Identify key microorganisms involved in fermentation                                                      | <p>2.1 Identify the key microorganisms used in different fermentation processes</p> <p>2.2 Identify the differences between different fermentation processes and when they are used</p> <p>2.3 Identify the indicators of successful fermentation for each different fermentation process</p>                                                                                                                                                                 |
| 3. Identify food poisoning and spoilage microorganisms that may result from incorrect fermentation practices | <p>3.1 Identify the major pathogenic organisms and any associated toxins that may be present in an unsuccessful ferment</p> <p>3.2 Interpret and determine appropriate action based on microbiological and chemical test results</p> <p>3.3 Determine the ramifications of fermented product contamination in terms of public health and product shelf-life quality</p>                                                                                       |
| 4. Perform microbiological sampling and testing techniques                                                   | <p>4.1 Perform microbiological sampling techniques to collect production samples</p> <p>4.2 Take samples to determine the presence of the pathogenic and spoilage organisms to confirm adequacy of operating processes, including plant sanitation</p> <p>4.3 Organise appropriate storage and transport of samples to testing facility</p> <p>4.4 Identify the appropriate range of actions required when out-of-specification test results are received</p> |
| 5. Identify the biochemical pathways that occur in fermented food and beverage production                    | <p>5.1 Identify the biochemical pathways associated with the different categories of fermented food and beverages</p> <p>5.2 Identify the reactions and properties of sugars and starches through a fermentation process</p>                                                                                                                                                                                                                                  |
| 6. Identify and conduct simple biochemical tests to track the process of fermenting food                     | <p>6.1 Identify the significance of a range of chemical parameters to track the progress of the fermentation process, including sugar levels, pH, acidity, water activity (<math>A_w</math>), salinity, alcohol</p> <p>6.2 Test for sugar levels to determine fermentation progress</p> <p>6.3 Test for starch levels to determine fermentation progress</p>                                                                                                  |

| Elements                                         | Performance Criteria                                                                                   |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <i>Elements describe the essential outcomes.</i> | <i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i> |
|                                                  | 6.4 Test for acidity to determine fermentation progress<br>6.5 Handle samples and reagents safely      |

## 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  | <ul style="list-style-type: none"> <li>Interpret food safety guidelines, standards and regulations</li> <li>Interpret documented processes for control of microbial growth in food products</li> </ul> |
| Numeracy | <ul style="list-style-type: none"> <li>Maintain and analyse data resulting from microbiological tests</li> <li>Determine calibration procedures and schedule for test equipment</li> </ul>             |

## Unit Mapping Information

| Code and title current version                                                                        | Code and title previous version | Comments | Equivalence status |
|-------------------------------------------------------------------------------------------------------|---------------------------------|----------|--------------------|
| FBPFST5031 Identify the microbiological and biochemical properties of fermented food and/or beverages | Not applicable                  | New unit | No equivalent unit |

## Links

Companion Volumes, including Implementation Guides, are available at VETNet: - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=78b15323-cd38-483e-aad7-1159b570a5c4>

# Assessment Requirements for FBPFST5031 Identify the microbiological and biochemical properties of fermented food and/or beverages

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## Performance Evidence

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

There must be evidence that the individual has identified and analysed microbiological and biochemical effects that take place in the fermentation of three different food and/or beverage products, including:

- conducting relevant in-process tests required to monitor the progress of fermentation.

## 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:

- types of fermentation, including yeasts, bacteria, symbiotic culture of bacteria and yeast (SCOBY) and fungi
- types and effects of microbiological and chemical hazards from incorrect fermentation (for each product)
- spoilage in fermented food and/or beverages and how they could be avoided
- processes used in the control of microbial growth in food products
- criteria for successful fermentation of different types of fermented food and beverages, including: organism, fermentation time, fermentation temperature, fermentation atmosphere (aerobic vs anaerobic), pH for different fermented food and beverage categories, water activity ( $A_w$ )
- major microorganisms responsible for food poisoning and spoilage
- Food Standards Code in relation to fermented food and beverages
- 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
- typical spoilage patterns in fermented foods caused by chemical and microbiological issues

- microbiological quality control programs
- plant hygiene, including sanitation and verification techniques
- 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
- potential microbiological pathogens
- chemical hazards
- critical control limits and microbiological processes and species in fermented food and beverage production
- characteristics and phenomena that occur during fermentation
- common chemical reactions that occur in food processing, including both spontaneous and controlled reactions, including:
  - the role of enzymes in generating biological reactions
  - tests commonly used to measure phenomena, and related units of measurement
  - transition phases applicable to a given production process
  - the role of temperature and pressure in the transition process
- pH and its impact on fermentation
- role of secondary fermentation.

## 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:
  - test equipment, manufacturers' advice and operating procedures
- specifications:
  - product standards.

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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