Modification history

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

| FBPFST5XX1 | Identify the microbiological and chemical properties of fermented food and beverages |
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| 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.  The individual is required to demonstrate technical and theoretical knowledge in a technical area and to design and communicate solutions to sometimes complex problems.  This unit applies to individuals who are responsible for analysing the microbiology and biochemistry of fermented food in food and beverage processing operations. They typically and undertake roles in overseeing the production process.  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. |
| Prerequisite Unit | Nil |
| Unit Sector | Food science and technology (FST) |

| Elements | Performance Criteria |
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| Elements describe the essential outcomes. | Performance criteria describe the performance needed to demonstrate achievement of the element. |
| 1. Apply the principles of microbiological quality control for successful fermentation | 1.1 Determine the fermentation criteria for successful fermentation for different fermented food and beverage categories  1.2 Identify the indicators of unsuccessful fermentation for different fermented food and beverage categories  1.3 Determine the correct microbiological quality control program for specific fermented food and beverage in terms of the Food Standards Code |
| 2. Identify food poisoning and spoilage bacteria that may result from incorrect fermentation practices | 2.1 Identify the major pathogenic organisms and any associated toxins that may be present in an unsuccessful ferment  2.2 Interpret and determine appropriate action based on microbiological and chemical test results  2.3 Determine the ramifications of fermented product contamination in terms of public health and product shelf-life quality |
| 3. Perform microbiological sampling and testing techniques | 3.1 Perform microbiological sampling techniques to collect production samples  3.2 Apply appropriate statistical sampling plans used to determine the sampling criteria (sample location, size, frequency)  3.3 Conduct tests to determine the presence of the pathogenic organisms and adequacy of plant sanitation  3.4 Organise appropriate storage and transport of samples to testing facility  3.5 Identify the appropriate range of actions required when out of specification test results are received |
| 4. Identify the biochemical pathways that occur in fermented food and beverage production | 4.1 Identify the biochemical pathways associated with the different categories of fermented food and beverages  4.2 Identify the reactions and properties of sugars and starches through a fermentation process |
| 5. Identify and conduct simple biochemical tests to track the process of fermenting food | 5.1 Identify the significance of a range of chemical parameters to track the progress of the fermentation process, including sugar levels, pH, acidity, density of liquids, water activity (aW)  5.2 Test for sugar levels to determine fermentation progress  5.3 Test for starch levels to determine fermentation progress  5.4 Test for acidity to determine fermentation progress  5.5 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. | |
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| Skill | Description |
| Reading | * Interprets food safety guidelines, standards and regulations * Interprets documented processes for control of microbial growth in food products |
| Numeracy | * Maintains and analyses data resulted from microbiological tests * Determines calibration procedures and schedule for test equipment |

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| Unit Mapping Information | | | |
| Code and title current version | Code and title previous version | Comments | Equivalence status |
| FBPFST5XX1 Identify the microbiological and chemical properties of fermented foods |  | New unit | No equivalent unit |

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

| TITLE | Assessment requirements for FBPFST5XX1 Identify the microbiological and chemical properties of fermented food |
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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 chemical effects that take place in the fermentation of three different food and/or beverage products, including:   * identifying the types and effects of microbiological and chemical hazards from incorrect fermentation (for each product) * identifying examples of spoilage in fermented food and/or beverages and how they could be avoided * conducting relevant in-process tests required to monitor the progress of fermentation. | |

| Knowledge Evidence |
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| 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 * 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 * major bacteria 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 * 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 * potential microbiological hazards, including: * Salmonella * Saccharomyces spp. * Streptococcus spp. * Listeria monocytogenes * chemical hazards * standard microbiological techniques to isolate and identify yeasts and bacteria in given food samples * 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 food processes, including: * differences between a strong acid and a concentrated acid * units of measurement * classification of commonly used materials, ingredients and indicators according to pH * the typical strengths and concentration levels required for commonly used acids and bases * the significance of pH for processing, food safety and cleaning applications. |

| Assessment Conditions |
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| 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 * 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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