Australian Government

Department of Education, Employment and Workplace Relations

FDFFST5006A Apply food microbiological techniques and analysis

Release: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills and knowledge required to perform tests and analysis in a food based microbiological laboratory. It requires high level skills in identifying the type of microbiological testing required, ensuring that test procedures follow documented protocols, and analysing and reporting the conclusions from testing to operation managers.

Application of the Unit

Application of the unit	This unit applies to senior technical staff, and production managers, who are required to analyse the microbiology of food in food processing operations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	FDFFST4004A Perform microbiological procedures in the food industry

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
• Identify food poisoning and spoilage bacteria, including methods of control.	• The major bacteria responsible for food poisoning and spoilage are identified. • The types of processes used in the control of microbial growth in food products are evaluated. • The effect of a standard food preserving technique over a range of pH, on the growth patterns of microbes is ascertained. • The effectiveness of this food preserving technique in controlling food poisoning and spoilage microbes is evaluated. • The usefulness of this technique, as part of process control of food poisoning and spoilage microbes is assessed. • Compliance with Food Standards are assessed for food preservation techniques.
• Perform microbiological techniques for the identification of food borne disease.	• Standard microbiological techniques to identify and enumerate food poisoning and spoilage organisms, from a food sample, are used. • The type of toxins, produced by the major food pathogens, are identified. • Documented food borne disease outbreaks, from the past, are investigated. • The ramifications of product contamination in terms of Public Health and product shelf-life quality are determined. • Specimens and waste are handled in accordance with enterprise OHS guidelines.
• Apply the principles of microbiological quality control.	• The spoilage patterns of specific foods at different temperatures of storage are ascertained. • The relationship between spoilage patterns and the growth cycle of the specific food spoilage/poisoning organisms is determined. • A microbiological quality control program for a specific food is designed, implemented and evaluated in terms of the Food Standards. • The importance of plant hygiene and how it can affect the finished product is determined. • Specimens and waste are handled in accordance with enterprise OHS guidelines.
• Apply rapid microbiological	• The principles of accelerated culture techniques are critically

ELEMENT	PERFORMANCE CRITERIA
techniques and other relevant technology for the identification of microbes related to plant hygiene.	examined. • The relevance of rapid microbiological technology, as related to control of plant hygiene, is identified. • A series of tests to determine the adequacy of plant sanitation procedures, by rapid microbiological or other techniques, is performed. • Specimens and waste are handled in accordance with enterprise OHS guidelines.
• Perform techniques involving microbial fermentations.	• The types and characteristics of micro organisms used for fermentation within the food industry are identified. • Standard microbiological techniques to isolate and identify yeasts and bacteria in given food samples are used. • Sub-culturing and pure culture techniques for "scale up" to "starter" cultures are performed. • New culture strains after fermentation are maintained using standard techniques.
• Analyse test results and provide recommendations to process controllers or production managers	• Results of microbiological tests are recorded and collated • Microbiological data is analysed and compared with food safety and food processing critical control limits and other parameters • Implications of test results are established and conclusions are drawn • Test results, conclusions and recommendations are documented and presented to food processing management

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Ability to:

- identify the major bacteria responsible for food poisoning and spoilage
- evaluate processes used in the control of microbial growth in food
- ascertain the effect of a standard food preserving technique on the growth patterns of microbes
- use standard microbiological techniques to identify and enumerate food poisoning and spoilage organisms, from a food sample
- identify the type of toxins, produced by the major food pathogens
- investigate documented food borne disease outbreaks from the past
- determine the ramifications of product contamination in terms of Public Health and product shelf-life.
- handle specimens and waste in accordance with enterprise OHS guidelines.
- ascertain the spoilage patterns of specific foods at different temperatures of storage.
- determine the relationship between spoilage patterns and the growth cycle of the specific food spoilage/poisoning organisms
- determine the importance of plant hygiene and how it can affect the finished product
- critically examine 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
- identify the relevance of rapid microbiological technology, as related to control of plant hygiene
- perform a series of tests to determine the adequacy of plant sanitation procedures, by rapid microbiological or other techniques, including:
- rinse methods
- swab methods
- replica or contact methods
- identify the types and characteristics of micro organisms used for fermentation within the food industry, including: Saccharomyces spp., Streptococcus spp. and Lactobacillus spp.
- use standard microbiological techniques to isolate and identify yeasts and bacteria in given food samples
- perform sub-culturing and pure culture techniques for "scale up" to "starter" cultures
- maintain new culture strains after fermentation using standard techniques.

REQUIRED SKILLS AND KNOWLEDGE

- record, analyse and present data, with associated conclusions and recommendations

Required knowledge

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
- statistical methods for process control including Viable Count Methods
- standard microbiological techniques to identify food poisoning and spoilage organisms
- microbiological toxins as produced by major food pathogens
- spoilage patterns
- growth cycle of micro organisms in food
- 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
- types and characteristics of fermentation micro-organisms, including
- Saccharomyces spp., Streptococcus spp. and 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

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	To meet the requirements of this Unit, the candidate must demonstrate that they are able to undertake microbiological testing and analysis in a food processing environment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Critical aspects of assessment must include evidence of the ability to use a range of microbiological techniques in food processing in compliance with quality and food safety system requirements, to apply rapid microbiological analysis techniques, and to perform techniques involving microbial fermentations.
Context of and specific resources for assessment	• Assessment of performance requirements in this unit should be undertaken within the context of food technology. Competency is demonstrated by performance of all stated criteria, including the critical aspects and knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statements applicable to the workplace environment. Assessment must occur in a real or simulated workplace where the assessee has access to: • Production process and related equipment, manufacturers' advice and operating procedures • Methods and related software systems as required for collecting data and calculating yields, efficiencies and material variances appropriate to production environment • Tests used to report relevant product/process information and recorded results
Method of assessment	The following assessment methods are suggested: • Observation of candidate conducting a range of tests and procedures • Written and/or oral questioning to assess knowledge and understanding • Completing workplace documentation • Third party reports

EVIDENCE GUIDE	
	• Case studies • Field Reports
Guidance information for assessment	Evidence should be gathered over a period of time in a range of actual or simulated environments.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Policies and procedures	• Codes of practice, regulations, Safety Data Sheets (SDSs) • AS/NZS 2243.3 - Safety in laboratories, Part 3: Microbiology • Enterprise Standard Operating procedures (EOPs): • safety requirements for equipment, materials or products • cleaning, hygiene, personal hygiene requirements • incident and accident/injury reports • Australian and international standards, including: • Food Standards Code 2002 Australia New Zealand and amendments • AS 2830 Good laboratory practice • AS/NZS 2243 Safety in Laboratories • AS/766 Food microbiology • Enterprise Standard Operating procedures(SOPs) • OHS legislation and enterprise requirements

Unit Sector(s)

Unit sector	Technical

Custom Content Section

Not applicable.