Australian Government

Department of Education, Employment and Workplace Relations

FDFFST4001A Apply food processing technologies

Release: 2

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Modification History

April 2012: Minor typographical corrections.

Unit Descriptor

This unit covers the skills and knowledge required to apply food processing technologies and to review their effectiveness and efficiency based on an understanding of food science and technology.

Application of the Unit

This unit applies to quality assurance and technical staff who have responsibility for maintaining product safety, quality and the production environment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Carry out fermentation as part of food or beverage production	1.1 Materials and equipment for a fermentation process are prepared 1.2 A fermentation process is applied and monitored 1.3 The fermented product is tested and evaluated
2. Review a fermentation process for a commercial food product	2.1 The critical control points (CCPs) and critical limits for product safety are reviewed 2.2 Operating procedures are reviewed for food safety and quality in fermentation 2.3 The food safety and production plans are reviewed for the fermentation process 2.4 Environmental impacts and associated costs are reviewed for fermentation in commercial food production
3. Carry out concentration and drying as part of food or beverage production	3.1 Materials and equipment for a concentration and drying process are prepared 3.2 A concentration and drying process is applied and monitored 3.3 The concentrated and dried food product is tested and evaluated
4. Review a concentration and drying process for a commercial food product	4.1 The CCPs and critical limits for product safety are reviewed 4.2 Operating procedures are reviewed for food safety and quality in fermentation 4.3 The food safety and production plan is reviewed for the fermentation process 4.4 Environmental impacts and associated costs are reviewed for fermentation in commercial food production
5. Carry out cooking or steaming as part of food or beverage production	5.1 Materials and equipment for a cooking or steaming process are prepared 5.2 A cooking or steaming process is applied and monitored 5.3 The cooked or steamed food product is tested and evaluated
6. Review a cooking or steaming operation for a commercial food product	6.1 The CCPs and critical limits for product safety are reviewed 6.2 Operating procedures are reviewed for food safety and quality in fermentation 6.3 The food safety and production plan is reviewed for the cooking or streaming process 6.4 Environmental impacts and associated costs are reviewed for fermentation in commercial food production

Required Skills and Knowledge

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

Required skills includes:

Ability to:

Fermentation

- recognise the biochemical principles of fermentation in production
- establish the role of micro-organisms in the fermentation process
- identify materials used in the fermentation process, including raw materials/pre-processed materials and starter cultures
- recognise the equipment used in the production of fermented food products
- apply appropriate quality control processes and procedures to assess fermented food products
- ferment samples of food successfully

Concentration and drying

- recognise the principles of concentration in production, including:
  - the aim of concentration in food processing
  - the need for concentration in food processing
  - heat transfer mechanism
- recognise the principles of drying in food production, including:
  - the aim of drying in food processing
  - the need for drying in food processing
  - heat transfer mechanism
- concentrate samples of food successfully
- dry samples of food successfully
- apply appropriate quality control processes and procedures to assess food products

Cooking or steaming

- sequence ingredient addition to meet recipe specifications
- start, monitor and adjust processing equipment to achieve required outcomes. Typical parameters monitored include:
  - time and temperature
  - agitation settings
  - weights
  - flow rates
  - flow diversion
  - characteristics of the mix such as colour, viscosity, density, and consistency
- take corrective action in response to out-of-specification results.

Required knowledge includes:

Knowledge of:

Fermentation

- biochemical principles of fermentation, including - lactic acid fermentation and alcohol fermentation.
- the major micro-organism groups used in fermentation, including Lactococcus, Steptococcus, Leuconostoc, Pediococcus, Lactobacillus bacterial species, yeasts and moulds
- the microbial growth phases - Lag phase, Log phase, Stationary phase and Death phase
- materials used in the fermentation process, including raw materials/ pre-processed materials and starter cultures (single strain starters, multiple strain cultures, mixed strains)
- quality control processes and procedures used to assess fermented food products.

Concentration and drying

- the principles of heat transfer in the concentration of food
- the principles of heat transfer in the drying of food
- the various methods of concentration of foods, including evaporation, filtration, reverse osmosis and freeze concentration
- the various methods of dehydrating foods, including cabinet, spray, drying and freeze dehydration
- quality control process and procedures used to assess concentrated and dried food products.

Cooking or steaming

- purpose and basic principles of heat sterilisation and effect on physical, chemical, micro-biological and organoleptic characteristics of the cooked product
- basic operating principles of equipment including safe operating procedures
- quality characteristics and conditioning required of ingredients used and their role in the product. Conditioning may include reconstituting dry ingredients and bringing ingredients to a required temperature
- effect of ingredient quality/condition on the process. This may include variables such as temperature, viscosity/texture, microbial load and acidity quality
- heat treatment requirements for low and/or high acid foods as appropriate to production requirements
- stages and changes which occur during the blending and heat treatment stages
- quality requirements of the cooked product.relationship between time and temperature in the cooking process.

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	A person who demonstrates competency in this unit must be able to apply fermentation, concentration and drying or cooking or steaming processes and to review their effectiveness and efficiency based on an understanding of food science and technology.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Critical aspects of assessment must include evidence of : applying methods for fermentation or concentration and drying or cooking or steaming; determining processes and critical limits for processing a food product; documenting physical, biochemical and biological changes to food products and testing criteria; and analysing process controls for a food processing operation, based on product testing.
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 at least one of the food processes specified, 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: • written and/or oral questioning to assess knowledge and understanding • observation of candidate conducting a range of processes and tests • a report on review of the production system.

Guidance information for assessment	Evidence should be gathered over a period of time in a range of actual or simulated environments.

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.	
Occupational health and safety requirements	• Codes of practice • Material Safety Data Sheet • Enterprise specific requirements.
Regulations	• Australian and international standards including: • industry guidelines and codes of practice • industry regulations • Australia New Zealand Food Standards Code • ISO Standards • codex alimentarius • State food regulators.
Methods of fermentation	• Fermentation processes in industry may include lactic acid fermentation and alcohol fermentation.
Materials and equipment for fermentation	• Fermentation equipment may include water baths, cabinets, tunnels, multipurpose tanks, and fermentation tanks. • Materials used in fermentation may include raw materials/pre-processed materials to be fermented, starters such as single strain starters, and multiple strain cultures, mixed strains.
Methods of concentration and drying	• Methods used to concentrate foods include evaporation, filtration, reverse osmosis and freeze concentration. • Methods used to dry foods include sun drying, cabinet, spray, drum drying and freeze dehydration.
Materials and equipment for concentration and drying	Heating and cooling systems, hygiene and sanitation equipment, drying, dehydration and systems, concentration systems and other relevant food processing equipment.
Materials and equipment for cooking or steaming	Equipment typically includes weighing and measuring equipment; sieves; blending and mixing equipment; cooking equipment or shell and tube heat exchangers/cookers (continuous processing).

Unit Sector(s)

Technical.