



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **FDFRB4003A Apply baking science to work practices**

**Release: 2**

## FDFRB4003A Apply baking science to work practices

### Modification History

April 2012: Minor typographical corrections.

### Unit Descriptor

<b>Unit descriptor</b>	This unit of competency covers the skills and knowledge required to apply principles of food science relevant to the production of bakery products.
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to the application of technical knowledge of food science as it relates to bakery products. It covers selection and processing of ingredients and production processes in order to maximise quality outcomes.</p> <p>The science of baking processes includes knowledge of how and why reactions occur and specific outcomes achieved, including the skills and knowledge to recognise the cause and effect of these reactions and how to problem solve faults in baking processes.</p> <p>Understanding of these principles is used to inform work in product development, production, testing, communication and problem solving.</p> <p>This unit must be applied to a range of bread, cake and pastry products.</p>
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### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## **Employability Skills Information**

Not applicable.

## **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. Select and use ingredients to ensure quality outcomes	1.1 Impact of ingredients on final product is identified and considered in selection, measurement and use 1.2 Processes used in the manufacture of ingredients and their impact on quality are identified and considered in the selection of ingredients 1.3 Types of food additives and corresponding E numbers used in bakery products, their functions and possible reactions are considered in the selection of ingredients 1.4 Reactions and properties of sugars, proteins and fats can be identified and tracked through baking production processes 1.5 Properties of common emulsions, suspensions and solutions and their impacts on quality are considered in the selection of ingredients 1.6 Common chemical reactions and factors required to cause a reaction are managed to control impact on quality 1.7 Legal and quality requirements relating to use of ingredients and food additives are applied 1.8 Knowledge of ingredients, processes and interactions is used to predict product shelf life 1.9 Problems relating to ingredients are identified and addressed
2. Manage nutritional features of bakery products	2.1 Public health and environmental hazards relating to bakery products are identified and controlled in bakery production 2.2 Intolerances to foods, artificial and natural additives used in baking products and typical reactions are identified and considered in product development and labelling 2.3 Allergies and autoimmune diseases relating to bakery products and typical reactions are identified and considered in product development and labelling 2.4 Alternative ingredients, production processes and products are selected to cater to customers with intolerance and allergies 2.5 Role of bakery products in diet and their nutritional features are determined 2.6 Regulations regarding nutritional labelling are applied
3. Control aspects of fermentation	3.1 Role and science of fermentation in bakery products is identified and process variations applied to achieve different outcomes 3.2 Types of fermentation and features of process are examined and selected according to product requirements 3.3 Role of Lactic Acid Bacteria (LAB) in fermentation and influences/factors are identified and managed 3.4 Impact of different fermentation processes on the bakery product

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
4. Manage baking processes	<p>is considered in selection of production processes</p> <p>4.1 Role and science of retardation in bakery products is identified and process variations applied to achieve different outcomes</p> <p>4.2 Role and science of freezing in bakery products is identified and process variations applied to achieve different outcomes</p> <p>4.3 Impact of temperature, moisture and time on production and product outcome are considered in management of operations</p> <p>4.4 Impacts of varying baking processes on production and product outcome are considered in production planning and management</p> <p>4.5 Production problems are identified and addressed</p> <p>4.6 Processes specified are in accordance with workplace environmental guidelines</p> <p>4.7 Baking processes are selected and managed to maximise production efficiencies</p>

## Required Skills and Knowledge

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

### Required skills include:

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#### Ability to:

- identify bakery ingredients and group them by function, including:
  - proteins
  - fats
  - carbohydrates
  - additives
- identify the role of enzymes in generating biological reactions (e.g. amylase in bread)
- read and interpret technical information to describe food properties and/or reactions, including recognising and applying appropriate units of measurement and terms
- review and/or establish procedures to describe storage, handling and processing conditions that affect the characteristics of ingredients, such as:
  - changes in pH
  - temperature change
  - specific gravity
  - exposure to light
  - exposure to humidity
  - packaging materials
- review and/or establish procedures to describe the method of preparation and addition of ingredients to food products produced in the workplace
- address production problems and determine root cause
- use oral communication skills language competence to fulfil the job role as specified by the organisation, including questioning, active listening, asking for clarification and seeking advice from supervisor
- work cooperatively within a culturally diverse workforce.

### Required knowledge includes:

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#### Knowledge of:

- types of ingredients and production processes used in bakery products
- the functions of ingredients
- what 'E' numbers are and how they apply to baking
- range of allergies and intolerances to bakery products
- the functions, interactions and potential problems associated with ingredients
- coding and labelling systems used to describe ingredients and additives
- the basic molecular structures of carbohydrates, proteins and fats
- for a given production process, the processing stages designed to affect the structure of these compounds

- information sources on allergies and intolerances relevant to baking products
- dough rheology and physical dough testing data
- determinants of bread quality
- hydrogenation of fats and oils
- shelf life prediction and testing
- legal requirements relating to labelling used as established by the Food Standards Code
- typical quantities used and related units of measurement
- preparation requirements
- mechanical and chemical aeration
- health and nutrition issues related to ingredients
- handling and processing conditions that affect the characteristics of ingredients
- typical problems with ingredients and production processes.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
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	Assessment must be carried out in a manner that recognises the cultural and literacy requirements of the assessee and is appropriate to the work performed. Competency in this unit must be achieved in accordance with food safety standards and regulations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of ability to:</p> <ul style="list-style-type: none"> <li>• identify bakery ingredients and describe their function and chemical changes through the production process</li> <li>• describe the nutritional features of bakery ingredients and products</li> <li>• identify possible allergies and reactions to bakery products</li> <li>• describe key baking processes and how and why they impact on ingredients and the final product outcome</li> <li>• identify and address common issues and problems with ingredients and production processes.</li> </ul>
Context of and specific resources for assessment	<p>Assessment must occur in a real or simulated workplace where the assessee has access to:</p> <ul style="list-style-type: none"> <li>• product specifications, including advice on ingredients</li> <li>• Food Standards Code</li> <li>• product range and related production processes</li> <li>• workplace information recording systems, requirements and procedures.</li> </ul>
Method of assessment	<p>This unit should be assessed together with core units and other units of competency relevant to the function or work role. Examples could be:</p> <ul style="list-style-type: none"> <li>• FDFTEC4005A Apply an understanding of food additives</li> <li>• FDFTEC4006A Apply an understanding of legal requirements in food production</li> <li>• FDFTEC4009A Identify the physical and chemical properties of materials, food and related products.</li> </ul>



**EVIDENCE GUIDE**

Guidance information for assessment	To ensure consistency of performance, competency should be assessed on more than one occasion over a period of time in order to cover a variety of circumstances, cases and responsibilities, and where possible, over a number of assessment activities.
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**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.

<b>Policies and procedures</b>	Work is carried out according to company policies and procedures, regulatory and licensing requirements, legislative requirements, and industrial awards and agreements and takes account of occupational health and safety (OHS) and environmental impacts
<b>Bakery products</b>	Bakery products may include: <ul style="list-style-type: none"> <li>• breads</li> <li>• cakes</li> <li>• pastry products</li> </ul>
<b>Ingredients</b>	Ingredients may include: <ul style="list-style-type: none"> <li>• yeast</li> <li>• processing aids (e.g. enzymes)</li> <li>• functional ingredients</li> <li>• fat replacers</li> <li>• flours</li> <li>• water</li> <li>• salt</li> <li>• folic acid</li> <li>• eggs and egg by-products</li> <li>• fruit</li> <li>• nuts, seeds and cereals</li> <li>• oils and fats</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• improvers</li> <li>• emulsifiers</li> <li>• humectants</li> <li>• dairy products</li> <li>• essences, additives and preservatives</li> <li>• sugar and glucose</li> <li>• jams and fillings</li> <li>• spices</li> </ul>
<b>Autoimmune diseases</b>	<p>Autoimmune diseases may include:</p> <ul style="list-style-type: none"> <li>• coeliac disease</li> <li>• Are there others?</li> </ul>
<b>Aspects of fermentation</b>	<p>Aspects of fermentation may include:</p> <ul style="list-style-type: none"> <li>• alcoholic fermentation</li> <li>• lactic acid fermentation:</li> <li>• facultative heterofermentative bacteria</li> <li>• obligate heterofermentative bacteria</li> <li>• obligate homofermentative bacteria</li> <li>• microbial growth kinetics (e.g. lag, log, peak and death stages)</li> <li>• metabolic activity</li> </ul>

### Unit Sector(s)

<b>Unit sector</b>	Retail baking
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