

Title	Demonstrate knowledge of yeast and fermentation		
Level	3	Credits	4

Purpose	People credited with this unit standard are able to: describe yeast and its use in fermented beverages; explain yeast growth and its role in fermenting beverages; describe the process of yeast culturing; demonstrate familiarity with a fermentation room; explain the processes of fermentation; and describe yeast cropping and storage.
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Classification	Food and Related Products Processing > Food Production - Beverages
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Available grade	Achieved
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Guidance Information

- 1 This unit standard is a general introduction to fermentation. For more specific information that relates to actual performance culturing yeast and controlling fermentation see unit standards 7717, 7766, and 7693.
- 2 This unit standard is to be assessed in the context of at least one of the following fermented beverage products: beer, wine, ginger beer, cider.

Outcomes and performance criteria

Outcome 1

Describe yeast and its use in fermented beverages.

Performance criteria

- 1.1 The description names the genus and species of the yeast used in food product fermentations, and includes an outline of growing conditions, and size of the yeast.

Range	fermentation type, temperature, rate of cell growth, fermented characteristics.
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- 1.2 The description outlines the process of classifying yeast strains and the significance of different strains for fermentation.

- 1.3 The description gives a definition and an example of a pure yeast strain and describes the advantages and disadvantages of its use in fermented beverages.
- Range pure yeast strain – reliability, ability to control infection and mutation, growth rates and requirements, and fermentation efficiency.
- 1.4 The description gives a definition and an example of a mixed yeast strain and describes the advantages and disadvantages of its use in fermented beverages.
- Range mixed yeast strain – reliability, ability to control infection and mutation, growth rates and requirements, and fermentation efficiency.
- 1.5 The description defines wild yeast and describes its potential effect on fermentations and the product in terms of the effect on alcohol levels, fermentation rate, flavour and stability.

Outcome 2

Explain yeast growth and its role in fermenting beverages.

Performance criteria

- 2.1 The explanation outlines the conditions for aerobic and anaerobic yeast growth in terms of necessary nutritional and biological factors.
- Range nutritional factors – availability of oxygen, energy source, amino acid source;
biological factors – enzyme activity on cell surface, role of the cell wall and membrane, enzyme activity and conversion of sugars inside the cell, cell growth and division.
- 2.2 The explanation outlines the main phases in fermentation in terms of speed and key features of yeast growth and growing conditions for each phase.
- Range main phases – lag, growth, stationary;
key features – rate of cell growth and division, conversion of sugars, use of oxygen, production of alcohol and CO₂, pH levels, flocculation.
- 2.3 The explanation outlines a desired fermentation profile for the fermentation process of a fermented beverage.
- Range profile – temperature, alcohol, pH, specific gravity.
- 2.4 The description outlines the influence of flavour compounds developed during fermentation on the flavour of a fermented beverage.
- Range flavour compounds – carbon dioxide, esters, alcohols, aldehydes, acids, sulphur compounds, vicinyl diketones.

Outcome 3

Describe the process of yeast culturing.

Performance criteria

- 3.1 The description outlines why yeast culturing is necessary for the maintenance of product quality.
- 3.2 The description outlines the process of yeast propagation in terms of how the main steps are applied in a commercial plant.
- Range yeast propagation – storage, sub-culturing, inoculation.
- 3.3 The explanation describes the general hygiene, process checks, and quality controls in accordance with the quality systems of a commercial plant.

Outcome 4

Demonstrate familiarity with a fermentation room.

Performance criteria

- 4.1 The general layout of a fermentation room is described in terms of the vessels and plant contained within it, and the movement of materials between them.
- Range fermentation type – batch, continuous; evidence of one is required.
- 4.2 Types of fermenting vessels used are given and their purpose explained in terms of the differences between the types.
- Range fermenting vessels – open, closed, dual purpose, shape variations.
- 4.3 A diagram is produced which links the main factors of a fermentation room's design to features in a commercial fermentation room.
- Range factors – hygiene, safety, quality control, design process.

Outcome 5

Explain the processes of fermentation.

Performance criteria

- 5.1 The explanation compares batch and continuous fermentation in terms of differences in plant management.
- Range management of – equipment, staffing, quality assurance, product flow.
- 5.2 The explanation outlines yeast pitching and oxygen control in terms of the requirements of either batch or continuous fermentation.
- 5.3 The explanation describes attemperation and cooling in terms of the requirements of either batch or continuous fermentation.
- 5.4 The explanation outlines the process of fermentation in terms of the requirements for a typical beverage.
- Range temperature control, yeast replacement, any additions during fermentation, quality controls.
- 5.5 The explanation describes how fermentation problems are addressed by the quality assurance processes of a commercial fermentation system.
- Range fermentation rate, attenuation, head formation, flocculation.

Outcome 6

Describe yeast cropping and storage.

Performance criteria

- 6.1 The description compares top and bottom yeast cropping in terms of the process used.
- 6.2 The description outlines the design and operation of a yeast storage plant in terms of its hygiene, safety, quality control, and process design.
- 6.3 The description includes the storage requirements for pitching yeast in terms of the need to maintain viability and prevent microbial infection.
- Range liquid yeast slurry, pressed yeast.
- 6.4 The description includes the process required for product recovery from yeast in terms of the operation of a system currently used commercially.
- Range process may include but is not limited to – centrifuge, filter press, vacuum filter, cross-flow filter.
- 6.5 The description includes process checks and quality control measures in accordance with the organisation's quality standards.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	6 May 1999	31 December 2022
Review	2	19 August 2004	31 December 2022
Review	3	28 January 2021	31 December 2022

Consent and Moderation Requirements (CMR) reference

0111

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.