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| **Title** | **Describe the cheese manufacturing process in a dairy processing operation** | | |
| **Level** | **5** | **Credits** | **15** |

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| **Purpose** | People credited with the unit standard are able to describe: the properties of milk and how these can influence cheese manufacture; the handling and processing of raw milk used for cheese making; the preparation and use of starters for cheese making; rennet coagulation of milk for cheese making; the cheese making process; the changes that occur during cheese ripening; and cheese composition control, in a dairy processing operation. |

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| **Classification** | Dairy Processing > Milk Products |

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| **Available grade** | Achieved |

**Guidance Information**

Legislation and regulations relevant to this unit standard includes but is not limited to:
- Animal Products Act 1999;
- Health and Safety at Work Act 2015;
- Animal Products (Dairy) Regulations 2005.

## Outcomes and performance criteria

### Outcome 1

Describe the properties of milk and how these can influence cheese manufacture in a dairy processing operation.

**Performance criteria**

1.1 Describe the properties of milk in terms of the influence of milk components on the cheese making process and on the properties of the final cheese.

Range fat, protein, water, minerals, lactose.

1.2 Describe the properties of milk in terms of conditions for microbial contaminants, growth and controls to achieve natural cheese product specifications.

Range microbial contaminants may include but are not limited to – psychrotrophs, coliforms, thermophiles, yeasts, moulds; evidence of three microbial contaminants is required.

**Outcome 2**

Describe the handling and processing of raw milk used for cheese making in a dairy processing operation.

**Performance criteria**

2.1 Describe the handling and processing of raw milk used for cheese making in terms of standardisation of milk to achieve a standard protein to fat ratio.

2.2 Describe the handling and processing of raw milk used for cheese making in terms of the purposes of heat treatment and the influences of heat treatment on cheese making.

Range heat treatment may include but is not limited to – pasteurisation, thermisation;
evidence of one heat treatment is required.

**Outcome 3**

Describe the preparation and use of starters for cheese making in a dairy processing operation.

**Performance criteria**

3.1 Describe the use of starters for cheese making in terms of the selection of starter organisms, maintenance of starter organism ratios and their impact on cheese making to achieve desired cheese characteristics in the final product.

3.2 Describe the use of starters for cheese making in terms of bacteriophage inhibition of starter organisms.

**Outcome 4**

Describe rennet coagulation of milk for cheese making in a dairy processing operation.

**Performance criteria**

4.1 Describe rennet coagulation of milk for cheese making in terms of the mechanism of coagulation and how to identify coagulation issues.

Range mechanisms include but are not limited to – enzymatic phase, coagulation phase.

4.2 Describe rennet coagulation of milk for cheese making in terms of factors that influence rennet coagulation.

Range factors include but are not limited to – type of rennet, temperature, pH, time, milk casein content, calcium concentration.

4.3 Describe rennet coagulation of milk for cheese making in terms of the influences of rennet coagulation and linkage with the final cheese product characteristics.

Range influences include but are not limited to – manufacturing conditions, flavour, functionality.

**Outcome 5**

Describe the cheese making process in dairy processing operation.

**Performance criteria**

5.1 Describe the cheese making process in terms of influences of cutting the coagulum on the cheese making process and cheese yield.

Range influences may include but are not limited to – pH, temperature, time, curd particle size, syneresis;
evidence of three influences is required.

5.2 Describe the cheese making process in terms of impacts of curd washing on the cheese making process and cheese characteristics.

Range impacts may include but are not limited to – syneresis, pH, lactose concentration;
evidence of two impacts is required;
cheese characteristics may include but are not limited to – moisture content, fat content, solids non-fat content, flavour, sensory;
evidence of one characteristic for a cheese variety is required.

5.3 Describe the cheese making process in terms of influences of cooking and stirring on the making process and subsequent cheese varieties.

Range cooking and stirring may include but is not limited to – direct heating, indirect heating, temperature, time;
evidence of one is required;
influences include but are not limited to – syneresis, case hardening, starter activity;
evidence of two influences is required.

5.4 Describe salting in terms of factors influencing salt uptake, and differences in salt dispersion in dry salted and brine salted cheeses.

Range factors include but are not limited to – curd particle size, curd condition at salting, salt application rate, salt application method, salt application period;
evidence of three factors is required.

5.5 Describe curd development, salting and block formation in terms of operating systems involved in the cheese making process.

Range operating systems may include but are not limited to – alfomatic, wincanton block formers, casomatic, table pressing system, brine salting system;
evidence of three operating systems is required.

**Outcome 6**

Describe the changes that occur during cheese ripening in a dairy processing operation.

**Performance criteria**

6.1 Describe changes that occur during cheese ripening in terms of differences in equilibration of moisture and salt distribution in rindless and rinded cheeses.

6.2 Describe changes that occur during cheese ripening in terms of the action of proteolytic enzymes on casein fractions.

Range proteolytic enzymes include but are not limited to – $\alpha_{s1}$(Alpha s1)-casein, $\beta$(Beta)-casein.

6.3 Describe changes that occur during cheese ripening in terms of texture and flavour development of rindless and rind cheeses.

6.4 Describe the cheese curd making process in terms of influences of the separation of curd from whey on cheese ripening.

Range influences may include but are not limited to – pH, residual rennet, calcium ion concentration, curd matting;
evidence of two influences is required.

**Outcome 7**

Describe cheese composition control in a dairy processing operation.

**Performance criteria**

7.1 Describe cheese composition control in terms of cheese process variables for control of fat in the dry matter (FDM) and the influence of FDM on moisture in the non-fat substance (MNFS).

7.2 Describe cheese composition control in terms of dependent and independent cheese process variables for control of MNFS.

7.3 Describe cheese composition control in terms of cheese process variables for control of salt-in-moisture.

7.4 Describe cheese composition control in terms of cheese process variables for control of cheese pH.

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| **Planned review date** | 31 December 2026 |

**Status information and last date for assessment for superseded versions**

| Process | Version | Date | Last Date for Assessment |
|---|---|---|---|
| Registration | 1 | 10 January 1994 | 31 December 2012 |
| Revision | 2 | 16 September 1997 | 31 December 2012 |
| Review | 3 | 5 July 1999 | 31 December 2012 |
| Revision | 4 | 13 June 2003 | 31 December 2012 |
| Rollover and Revision | 5 | 20 June 2006 | 31 December 2012 |
| Rollover | 6 | 17 July 2009 | 31 December 2012 |
| Review | 7 | 17 May 2012 | 31 December 2016 |
| Review | 8 | 18 June 2015 | 31 December 2024 |
| Review | 9 | 28 April 2022 | N/A |

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| **Consent and Moderation Requirements (CMR) reference** | 0022 |

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

**Comments on this unit standard**

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.