

Department of Primary Industry

**AUSTRALIAN CODE OF PRACTICE
FOR DAIRY FACTORIES**

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Section G

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Section G— Hygienic manufacturing practice for cheese

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Section G— Hygienic manufacturing practice for cheese

Part I—Introduction

Scope

- G1.1 This Code of Practice applies to cheese as defined. It recommends general hygiene and manufacturing practices of use in handling (including production, preparation, processing, packaging, storage, transport and distribution) of cheese for human consumption to ensure safe, sound and wholesome products.

Definitions

- G2.1 Cheese includes all products intended for sale for human consumption and described as “cheese” or any variety of cheese.

Part II—Establishment: design and facilities

Location

- G3.1 Establishments where whey is disposed of in a potentially hazardous manner (e.g. piggeries, pastures irrigated with whey, etc.), if located in the vicinity of the factory should, whenever possible, be sited well away and on the leeward side from cheese factories.

Buildings and facilities

- G4.1 To minimise the risks of phage problems, a cheese factory layout which protects the product in its earliest stages of manufacture from phages generated in later stages of processing is desirable. Air-conditioning should direct air movement in parallel with product flow. Complete physical separation is desirable between vat stages and subsequent operations (separate rooms or buildings). Re-circulation type air-conditioning should not be used.

Ventilation

- G5.1 In cheese factories, phage hazards need to be considered when designing ventilation systems. Intake points should be located so as to minimise risks, i.e. not near whey tanks, etc.
- G5.2 Special care should be taken to ensure air-conditioning outlet points in the factory are located so as to prevent extraneous matter contamination of exposed product during manufacture and packaging.
- G5.3 Bulk starter rooms require adequate exhaust fans to remove steam during heating. Independently controlled positive pressure air-conditioning is also desirable to allow still air during inoculation and to maintain outward air movement at other times. The source of inlet air should be away from other manufacturing areas and any potential hazards.

Equipment and utensils

- G6.1 Adequate provision should be made for the hygienic collection or disposal to drains, etc., of all whey and for the minimisation of spillages, splashing and escape of product or whey.

Part III—Establishment: hygiene requirements

Maintenance

- G7.1 Special attention should be given to, and adequate facilities provided for, the frequent and regular disposal of contaminated and/or spilled products.
- G7.2 All equipment used for the manufacture and packaging of cheese should be regularly and frequently inspected for cracks, damage and accumulation of milk solids, etc.

Cleaning and sanitising

- G8.1 To prevent bacterial contamination of cheese, all equipment and utensils should be cleaned frequently and sanitised wherever circumstances demand. (Special attention should be given to vats, especially where refilling is practised.) "Closed" vats, etc., should be fitted with effective automatic in-place cleaning devices.
- G8.2 Special clean protective clothing and footwear should be worn by any person entering vats or other equipment for the purpose of cleaning or maintenance during manufacture. (This particularly applies to engineering and maintenance staff).
- G8.3 Adequate precautions should be taken to prevent raw materials, product or packaging materials from being contaminated with water, detergents, sanitisers or their solutions during cleaning or sanitising of rooms, equipment or utensils. Detergents and sanitisers should be suitable for the purpose intended and should conform to public health requirements and comply with relevant Australian Standards. Any residues of these agents on a surface which may come in contact with a food should be removed by thorough rinsing with potable water.
- G8.4 Either immediately after cessation of work for the day or at such times as may be appropriate, floors, including drains, auxiliary equipment and walls of manufacturing areas should be thoroughly cleaned.
- G8.5 Roadways and yards in the immediate vicinity of and servicing the premises should be kept clean and free from any refuse accumulation.

Part IV—Establishment: hygiene processing requirements

Raw materials requirements

- G9.1 All milk used in the manufacture of cheese products should have been produced under hygienic conditions in compliance with the provisions of the official agency having jurisdiction.
- G9.2 Tests should be carried out on incoming milk to ensure that any unsatisfactory raw material is withheld from processing.

- G9.3 Raw materials and ingredients stored on the premises should be maintained under conditions that will prevent spoilage, protect against contamination and minimise damage. Stocks of raw materials and ingredients should be properly rotated.
- G9.4 All packaging material used should be regularly checked for faults and contaminants.

Prevention of cross contamination

- G10.1 Effective measures should be taken to prevent contamination of pasteurised milk or heat treated product, by direct or indirect contact with raw milk or material from a later stage of cheese manufacture.
- G10.2 In this regard it is important to ensure that salted curd particles and cheese trimming from block weight adjustments are not returned to and processed with the earlier stages of manufacture of the subsequent vats.
- G10.3 Handling of cheese by personnel during manufacture should be kept to an absolute minimum.
- G10.4 Adequate facilities should be provided for hand washing and sanitising, and all personnel should continually be encouraged to wash and sanitise their hands when moving from one section of manufacture to another.
- G10.5 Entrance to starter propagation areas should be restricted to specific personnel who should use clean apparel and footwear kept specifically for use in such areas. Unless absolutely necessary, no operations or processes which are unhygienic or likely to contaminate or taint the product, shall be carried out in an area at the same time that the area is in use for cheese manufacture or storage.

Processing

- G11.1 Processing should be supervised by a qualified cheese maker.
- G11.2 After inspection and testing, incoming milk or liquid milk products should be processed quickly or, if this is not possible, cooled to 4°C or less and held at this temperature until processing.
- G11.3 All milk should be pasteurised for cheese making unless other acceptable heat treatments are used. Adequate heat treatment facilities should be provided.
- G11.4 All steps in the production process should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage organisms. It is essential that an active starter culture be used to ensure normal acid production.
- G11.5 A continuous chart recording should be made of all pasteurisation or heat treatment operations, and these charts should be dated and retained for inspection for a period of at least two years. A manufacture log should also be kept.
- G11.6 Special precautions should be taken in the case of "starter failure" cheese in which acid production has been severely or totally retarded. When acid production fails altogether, the curd must be dried by means of high temperature cooking and high salt dosage, and must be disposed of for processing purposes only. Where acid production has been retarded, the cheese should be tested for coagulase positive staphylococci and pH on the day after manufacture. Coagulase positive staphylococci, when present in large numbers, may produce toxins which can cause serious illness when consumed. The toxins remain after the organisms die out and can only be monitored by very costly tests. Consequently, the maximum number of coagulase positive staphylococci present at any time in the cheese is

important as an indicator of the potential presence of harmful toxin levels. “Express” staph and pH tests should be used as a basis for deciding on the disposal of suspect cheese. The basis of decision must ultimately be the responsibility of the appropriate Dairy Authority, depending on the place of manufacture and/or intended end use of the product.

Extraneous matter control

- G12.1 The presence of extraneous matter in cheese is extremely detrimental to product quality. Successful extraneous matter control depends on continual alertness and commonsense on the part of all factory staff. Strict attention to the following points will help to eliminate and/or minimise extraneous matter contamination:
- (a) filtration of incoming milk;
 - (b) fly proofing;
 - (c) exclusion as far as possible of dust and airborne debris or microbiological contamination, e.g. by filtered positive air intake and pressure where necessary;
 - (d) dress of operators (headgear and overalls with top pockets removed), removal of jewellery;
 - (e) keeping all overhead pipes, beams, agitator supports, etc., free from dust, loose paint and rust;
 - (f) proper maintenance of all cheese handling equipment, especially curd mills, conveyor belts, and shielding of agitator drive motors, pulleys, belts and drive sprockets;
 - (g) exclusion of glass equipment from manufacture areas — any cheese suspected of containing glass should be destroyed;
 - (h) use of good quality non-frayed cheese cloths which can be easily seen on the cheese surface;
 - (i) a system of identifying extraneous matter hazards, and programmed inspections should be used as a basic management tool. Such a system (CEMP) is required by the Australian Dairy Corporation for factories exporting cheese to Japan. CEMP groups extraneous matter sources as follows:
 - (i) *Environmental:*
This category includes insects, rodents, dust, stones, wood, nails, rust, paint, etc.
 - (ii) *Human:*
Hair, hair clips, buttons, wound dressings, threads from clothing, earrings, cigarette butts, watchbands; residue from electrical and mechanical repairs, e.g. plastic covering, metal turnings, brass screws, etc.
 - (iii) *Equipment:*
Items of plastic or metal composition which form part of manufacturing equipment and have been subject to damage or failure in operation; cheese cloths/threads (both cotton and disposable plastic), glass, mercury (from thermometers, laboratory equipment); hydraulic fluid, lubricating oil and grease; contaminated compressed air, paint flakes, rust, electrolytic plating, electrical fittings, metal flakes from surface to surface contact, etc.

(iv) *Raw materials:*

Plastic and cellulose type material from packaging such as salt bags, sand and vegetable matter, e.g. from salt, metal filings/powder, plastic turnings, pesticides, etc.

- G12.2 When breakdowns or unplanned discontinuities in processing occur which disrupt the normal flow of product, the batch should not be released for human consumption unless adequate precautions are taken to ensure acceptable hygienic quality of the batch.

Packaging

- G13.1 All packaging material should be stored in a clean and hygienic manner. The material should be appropriate for the product to be packed and for the expected conditions of storage. It should not transmit any objectionable odours or substances to the product. The packaging material should be sound and provide appropriate protection from contamination. Where Australian Standards exist, they should be complied with.
- G13.2 Product containers should not be used for any purpose which could lead to product contamination. Containers should be inspected immediately before use. Only packaging material required for immediate use should be kept in the packing or filling area.
- G13.3 Packaging should be done under conditions which preclude the introduction of contamination into the product.
- G13.4 *Product coding:* Products sold or otherwise distributed from an establishment should be coded to enable identification of lots and, when necessary, segregation of specific lots which may have become contaminated or otherwise unfit for their intended use. Records adequate to identify the processing history of each lot should be retained for a period that exceeds the shelf-life of the product, except that, unless a specific need exists, they need not be retained for more than two years. Sequential numbering of cartons from sequential cheese making machines is desirable.

Storage and transport of end product

- G14.1 The end product should be stored and transported under such conditions as to preclude contamination with and/or proliferation of undesirable micro-organisms, and protect against deterioration of the product or damage to the container.

Sampling and quality control procedures

- G15.1 The establishment should be provided with, or have access to a laboratory with appropriate testing facilities and trained staff competent to draw samples and perform specified tests to establish the quality and integrity of raw materials, process and finished product.
- Quality specifications for raw materials, product-in-process, finished products, manufacturing environment and ancillary materials (e.g. packaging, detergents and sanitisers, etc.) should be prepared and documented to form component parts of the company quality manual.
- G15.2 Analytical procedures should follow recognised standard methods.

- G15.3 Provision must be made for systematic microbiological tests to determine that heat treatment and sanitising processes have been successfully accomplished, particularly at critical points. This includes phosphatase tests of pasteurisation, coliform tests on heat treated milk and curd, coliform and staphylococci tests on cheese, monitoring of microbiological quality of raw materials and the manufacturing environment, and control of starter cultures to maintain their activity.
- G15.4 The results of microbiological testing should be assessed daily and in the event of a significant deviation beyond specified limits for the product or process, a prompt investigation should be initiated to enable corrective action to be taken.
- G15.5 The records of microbiological examinations should be retained at each plant for at least two years. It would also be appropriate to maintain the microbiological records relating to the various manufacturing processes. All records should be available for inspection as required. Means of identifying vat samples should also be provided.
- G15.6 The person in charge of the quality control program should also have authority commensurate with the responsibilities associated with planning, co-ordinating, executing and maintaining the plant quality control programs.

Part V—End product specifications

General requirements

- G16.1 Products should be free from foreign matter to the extent possible with the application of good manufacturing practice, and should comply with the appropriate prescribed maximum tolerance levels for toxic substances.
- G16.2 No cheese or cheese products should be distributed for human consumption until the results of microbiological examination are known to satisfy the requirements of the appropriate standards.
- G16.3 Cheese and cheese products should comply with the requirements for pesticide residues and food additives as laid down by the NH & MRC.
- G16.4 Compositional standards for cheese and cheese products laid down by State and Federal legislation, pertaining to market requirements, must be met.

Microbiological specifications

- G17.1 Microbiological standards for cheese and cheese products are laid down by State and Federal Legislation. Particular attention must be paid to the absence of *Escherichia coli* and coagulase positive staphylococci.
- G17.2 Prescribed standards and methods of microbiological analysis for cheese are as follows:
- (a) *Escherichia coli*:
Proceed as in Standards Association of Australia, Australian Standard AS 1095.2.4 except that for the purpose of this prescribed method when five separate portions of cheddar or gouda cheese are examined as detailed, the result shall be reported as "no *Escherichia coli* detected in 0.01g" only when no *Escherichia coli* has been detected in 0.01g in at least four of the five portions;

- (b) Coagulase positive staphylococci: Proceed as in Standards Association of Australia Standard, AS 1095.2.4 except that for the purpose of this prescribed method, when five separate portions of cheese are examined as detailed, the result shall be reported as "no coagulase positive Staphylococci detected in 0.1 g" only when no coagulase positive staphylococci has been detected in 0.1g of at least four of the five portions.