

Imported food risk statement
Cheese (production includes a heat treatment step) and *Brucella* spp.

Commodity: Cheese that has undergone a heat treatment step during production. Examples of this type of product include cheese prepared from pasteurised or thermised milk (with additional hurdles) or those subject to a high temperature curd cook.

Microorganism: *Brucella* spp.

Recommendation and rationale
<p>Is <i>Brucella</i> spp. in cheese that has undergone a heat treatment step during production a medium or high risk to public health*:</p> <p><input type="checkbox"/> Yes</p> <p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Uncertain, further scientific assessment required</p> <p>Rationale:</p> <ul style="list-style-type: none"> • Effective through chain controls include a heat treatment step sufficient to inactivate <i>Brucella</i> spp. • There is a lack of evidence in the scientific literature of illness caused by <i>Brucella</i> spp. in this category of cheese <p>*Provided that effective through chain controls are in place</p>

General description
<p>Nature of the microorganism:</p> <p><i>Brucella</i> spp. are aerobic, Gram-negative, non-sporeforming short spherical to rod-shaped bacteria. <i>Brucella</i> spp. are pathogenic for a wide range of animals, with four species of <i>Brucella</i> also known to be pathogenic for humans (FSANZ 2006; Perkins et al. 2010). They can colonise virtually all organs and tissues of an infected individual and can persist intracellularly for years and may cause recurrent infections. <i>Brucella</i> spp. can be transmitted zoonotically via the consumption of raw products from an infected animal or through contact with infected animals at the farm and during slaughter (ICMSF 1996; FDA 2012).</p> <p><i>Brucella</i> spp. can grow at temperatures between 6 – 42°C, pH of 4.5 – 8.8 and up to a maximum NaCl content of 4% when other conditions are near optimum. Pasteurisation of milk at 72°C for 15 seconds (or equivalent) is sufficient to inactivate <i>Brucella</i> spp. Also, <i>Brucella</i> spp. are able to survive frozen storage. Foods that are high in fat may have a protective effect, with <i>Brucella</i> spp. able to survive for longer periods of time in these products (ICMSF 1996; FSANZ 2006).</p>
<p>Adverse health effects:</p> <p><i>Brucella</i> spp. are considered a serious hazard as they cause incapacitating but not usually life threatening illness of moderate duration and sequelae are rare, although if diagnosis of brucellosis is delayed, it can lead to chronic disease. People of all ages are susceptible to brucellosis. However, the elderly, infants and immunocompromised individuals are at a greater risk of infection and developing more severe symptoms</p>

(ICMSF 2002; FSANZ 2006; FDA 2012).

Initial symptoms of brucellosis include undulant fever, chills, sweating, weakness, malaise, headache and joint and muscle pain. In some cases additional symptoms develop such as shortness of breath, irregular heartbeat, edema, chest pain, severe headaches, stiff neck, confusion, seizures or back pain. The onset of illness is usually within 3 weeks; however a longer incubation period can occur. The symptoms of brucellosis usually only last for a few weeks when antibacterial therapy is used, however, symptoms may reappear and last for months or even years. The fatality rate for brucellosis is generally less than 2% (FDA 2012).

It has been estimated that fewer than 500 cells of *Brucella* spp. can cause illness. Humans appear to be more susceptible to *B. melitensis* than to other *Brucella* spp. that infect humans (FDA 2012).

Consumption patterns:

In the 2007 Australian National Children’s Nutrition and Physical Activity Survey, 71% of children aged 2 – 3 years and 67% of children aged 4 – 8 years reported consumption of this category of cheese (DOHA 2008). In the 2011 – 2012 Nutrition and Physical Activity Survey (part of the 2011 – 2013 Australian Health Survey), 43% of children aged 2 – 3 years, 39% of children aged 4 – 8 years and 31% of adults (aged 19 years and above) reported consumption of this category of cheese (ABS 2014). For both the 2007 and the 2011 – 2012 survey, mixed foods that contained cheese were excluded from the analysis. The 2007 survey derived data from two days of dietary recall data for each respondent (a respondent is counted as a consumer if the food was consumed on either day one or day two, or both days), compared with only one day of dietary recall data for the 2011 – 2012 survey. Using two days of data will result in a higher proportion of consumers compared to a single day only, meaning the results are not directly comparable.

Key risk factors:

Brucella spp. can be a contaminant of raw milk sourced from infected herds. Through chain controls, including effective heat treatment during cheese production, will negate this risk.

Post processing contamination can occur, although a number of processing factors and/or product characteristics influence the potential for growth of *Brucella* spp. in cheese including pH, salt concentration, water activity and maturation/ripening conditions (FSANZ 2006).

Risk mitigation:

Pasteurisation of milk, or equivalent measures during production as specified under clause 16 of [Standard 4.2.4 in the Australia New Zealand Food Standards Code](#) (the Code), will inactivate *Brucella* spp. Good hygienic practices in food manufacturing and food handling will minimise *Brucella* spp. contamination of cheese.

In Australia [Standard 4.2.4 of the Code](#) sets out a number of food safety requirements for primary production and processing of dairy products, including the implementation of documented food safety programs for dairy primary production, collection, transportation and processing.

Compliance history:

Imported cheese of this category is not currently required to be tested for *Brucella* spp., and therefore no compliance data is available from the Imported Food Inspection Scheme of the Australian Department of Agriculture.

There have been no notifications on the European Commission’s Rapid Alert System for Food and Feed (RASFF) for *Brucella* spp. in this category of cheese from January 2007 – January 2014.

There have been no food recalls in Australia due to the presence of *Brucella* spp. in imported or domestic cheese of this category from January 2007 – January 2014.

Surveillance information:

Australia is free from bovine brucellosis (FSANZ 2006).

Brucellosis is a notifiable disease in all Australian states and territories, with a reported incidence rate in 2013 of 0.1 cases per 100,000 population (14 cases). This is the same as the previous five year mean of 0.1 cases per 100,000 population per year (ranging from 0.1 – 0.2 cases per 100,000 population per year) (NNDSS 2014). All cases of *B. melitensis* or *B. abortus* in Australia are related to overseas travel. *B. suis* infection is confined to some areas of Queensland, where it occurs in feral pigs (NNDSS 2013).

Illness associated with consumption of cheese (production includes a heat treatment step) contaminated with *Brucella* spp.

A search of the scientific literature via the EBSCO Discovery Service and the US CDC Foodborne Outbreak Online Database during the period 1990 – September 2014 did not identify any brucellosis outbreaks associated with consumption of this category of cheese. There was one outbreak, described by VDH (2010) and CDC (2014), that was associated with cow milk cheese and goat milk cheese, however, it was unclear whether the production of these cheeses included a heat treatment step.

Data on the prevalence of *Brucella* spp. in cheese (production includes a heat treatment step)

A search of the scientific literature via the EBSCO Discovery Service and other published literature during the period 1990 – September 2014 identified that data on the prevalence of *Brucella* spp. in this category of cheese is limited.

- Survey in Italy, where *Brucella* spp. were not detected in Mozzarella cheese samples (n=150) or Ricotta cheese samples (n=100), although it was not stated if the cheese had a heat treatment step during production (Serpe et al. 2000; FSANZ 2006)
- Survey in Mexico, where *Brucella* spp. were detected in 7.5% of fresh white cheese samples (n=335), although it was not stated if the cheese had a heat treatment step during production (Acedo et al. 1997; FSANZ 2006)

Other relevant standards or guidelines

- Codex general principles of food hygiene *CAC/RCP 1 – 1969* provides key hygiene controls from primary production through to final consumption (Codex 2003)
- Codex code of hygienic practice for milk and milk products *CAC/RCP 57-2004* covers additional hygienic provisions for the production, processing and handling of milk and milk products (Codex 2004)

Approach by overseas countries

Many countries, such as the European Union, the United States and Canada, have HACCP-based measures in place for production of this commodity.

Other considerations

Quarantine restrictions apply to products under this commodity classification. Refer to the [ICON database](#).

This risk statement was compiled by FSANZ in: July 2015

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