

## Imported food risk statement

### Uncooked ready-to-eat sausages and *Listeria monocytogenes*

**Commodity:** Uncooked ready-to-eat (RTE) sausages. Examples of this type of product include salami, cacciatore, chorizo, dried sausages and semi-dried sausages. Spreadable sausages and sausages in ambient stable sealed packages are not covered by this risk statement.

**Microorganism:** *Listeria monocytogenes*

Recommendation and rationale
<p>Is <i>L. monocytogenes</i> in uncooked RTE sausages 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><b>Rationale:</b></p> <ul style="list-style-type: none"><li>• Listeriosis attributed to the consumption of uncooked RTE sausages is uncommon</li><li>• Uncooked RTE sausages have a low water activity and so do not support the growth of <i>L. monocytogenes</i> during retail storage</li></ul>

General description
<p><b>Nature of the microorganism:</b></p> <p><i>L. monocytogenes</i> is a Gram-positive, non-spore forming rod-shaped bacterium that can grow in both aerobic and anaerobic conditions. It is found throughout the environment and has been isolated from domestic and wild animals, birds, soil, vegetation, fodder and wet areas of food processing environments (FSANZ 2013).</p> <p>A distinguishing feature of <i>L. monocytogenes</i> is its ability to grow at refrigeration temperatures. Growth can occur at temperatures between 1.5 – 45.0°C, pH of 4.0 – 9.6 and a minimum water activity of 0.90 when other conditions are near optimum. Temperatures above 50°C are lethal to <i>L. monocytogenes</i>, however, it is able to survive frozen storage at -18°C (ICMSF 1996; FSANZ 2013).</p>
<p><b>Adverse health effects:</b></p> <p>For susceptible populations <i>L. monocytogenes</i> is a severe hazard as it can cause life threatening illness (ICMSF 2002). People at risk of invasive listeriosis include pregnant women and their foetuses, newborn babies, the elderly and immunocompromised individuals (such as cancer, transplant and HIV/AIDS patients). Less frequently reported, but also at a greater risk, are patients with diabetes, asthma, cirrhosis and ulcerative colitis (FSANZ 2013).</p> <p>In pregnant women invasive listeriosis can cause spontaneous abortion, stillbirth or neonatal infection. Influenza-like symptoms, fever, and gastrointestinal symptoms can also occur in the mother. In immunocompromised individuals and the elderly invasive listeriosis can cause potentially fatal bacterial meningitis with symptoms of fever, malaise, ataxia and altered mental status. The onset of illness of invasive listeriosis generally ranges from 3 days to 3 months after infection. Invasive listeriosis has a fatality rate of 15 – 30% (FDA 2012; FSANZ 2013).</p> <p>Nearly all cases of listeriosis in susceptible people result from the consumption of high numbers of the pathogen (Chen et al. 2003; FAO/WHO 2004). However, some foods support the growth of <i>L. monocytogenes</i>, enabling high levels of <i>L. monocytogenes</i> to be achieved that may lead to illness.</p> <p>Exposure to <i>L. monocytogenes</i> has minimal impact on the general healthy population. If illness does occur it is often mild and may be mistaken for a viral infection or flu (FSANZ 2012).</p>

FSANZ provides risk assessment advice to the Department of Agriculture on the level of public health risk associated with certain foods. For more information on how food is regulated in Australia refer to the [FSANZ website](#) or for information on how imported food is managed refer to the [Department of Agriculture website](#).

**Consumption pattern:**

One percent of children (aged 2-16 years), 2% of adults (aged 17-69 years) and 1% of people aged 70 and above reported consumption of uncooked RTE sausages in the 1995 National Nutrition Survey (McLennan and Podger 1999). In the 2007 Australian National Children's Nutrition and Physical Activity Survey, 5% of children (aged 2-16 years) reported consumption of uncooked RTE sausages (DOHA 2008).

**Key risk factors:**

Post-processing contamination including cross-contamination can occur as *L. monocytogenes* is a ubiquitous organism.

**Risk mitigation:**

Reducing the prevalence of *L. monocytogenes* at the processing plant level and reducing the initial load of *L. monocytogenes* on finished RTE processed meat would lead to a significant reduction of the number of cases of listeriosis resulting from consumption of processed RTE meat (Ross et al. 2009). Good hygienic practices in food manufacturing and food handling will minimise *L. monocytogenes* contamination of uncooked RTE sausages.

Uncooked RTE sausages do not support the growth of *L. monocytogenes* during retail storage due to the low water activity of these products (Farber et al. 2007; Codex 2009; Akingbade et al. 2013).

In Australia Division 3 of [Standard 4.2.3 of the Australia New Zealand Food Standards Code](#) (the Code) states that RTE meat must be produced under a food safety management system which identifies, evaluates and controls food safety hazards. Clause 5 includes additional requirements for uncooked comminuted fermented meat for the fermentation, maturation and smoking processes. [Standard 1.6.1 of the Code](#) contains limits for *L. monocytogenes* based on whether growth can occur or not:

- For RTE food in which growth of *L. monocytogenes* will not occur n=5, m=10<sup>2</sup> cfu/g
- For RTE food in which growth of *L. monocytogenes* can occur n = 5, m=not detected in 25g

Public information for vulnerable populations to avoid consumption of ready-to-eat food that supports the growth of *L. monocytogenes* is available on various government websites [including FSANZ's website](#).

**Compliance history:**

The imported food compliance data sourced from the Imported Food Inspection Scheme of the Australian Department of Agriculture indicated that during the period of January 2007 – June 2013 there were no imports of uncooked RTE sausages.

There have been 43 notifications on the European Commission's Rapid Alert System for Food and Feed (RASFF) for *L. monocytogenes* in uncooked RTE sausages during the period January 2007 – June 2013. Products notified included cacholeira sausage, chorizo, meat spread, salami and others. These detections were from multiple countries. Among the notified products counts of *L. monocytogenes* varied from being detected in 25 g to 31,000 CFU/g. There were an additional four notifications for *L. monocytogenes* in sausages and three notifications for *L. monocytogenes* in several undisclosed meat and delicatessen products from multiple countries, however, it was not stated if any of these products were uncooked RTE sausages.

There have been five food recalls in Australia of uncooked RTE sausages due to the presence of *L. monocytogenes* from January 2007 – June 2013. The recalled products were cacciatore, chorizo, salami and wurst produced domestically.

**Surveillance information:**

Listeriosis is a notifiable disease in all Australian states and territories with a notification rate in 2012 of 0.4 cases per 100,000 population (93 cases). The previous five year mean was 0.3 cases per 100,000 population per year (ranging from 0.2 – 0.4 cases per 100,000 population per year) (FSANZ 2013).

### Illness associated with consumption of uncooked RTE sausages contaminated with *L. monocytogenes*

A literature search with the EBSCO Discovery Service did not identify any listeriosis outbreaks associated with consumption of uncooked RTE sausages in the period of 1990 – June 2014.

### Prevalence of *L. monocytogenes* in uncooked RTE sausages

Surveys of uncooked RTE sausages have isolated *L. monocytogenes* in 3 – 23% of samples (Levine et al. 2001; Gianfranceschi et al. 2006). Examples of surveys are listed below:

- Surveys conducted by the New South Wales Food Authority from 2001 – 2012, *L. monocytogenes* was isolated from 8.2% of uncooked fermented meat samples (n=49), although these were not enumerated (New South Wales Food Authority, pers. com.)<sup>1</sup>
- Survey in Italy in 2007 – 2009, *L. monocytogenes* was isolated from 20.5% of salami samples at retail (n=112), although these were not enumerated (Pinto et al. 2010)
- Survey in Italy in 2002 – 2003, *L. monocytogenes* was isolated from 22.7% of salami samples (n=1,020), the level of contamination was <10 CFU/g (Gianfranceschi et al. 2006)
- Surveys in the United States in 1990 – 1999, *L. monocytogenes* was isolated from 3.25% of dry and semi-dry fermented sausages (n = 830), although these were not enumerated (Levine et al. 2001)

### Other relevant standard or guideline

- Codex general principles of food hygiene *CAC/RCP 1 – 1969* follows the food chain from primary production through to final consumption, highlighting the key hygiene controls at each stage (Codex 2003)
- Codex code of hygienic practice for meat *CAC/RCP 58-2005* covers additional hygienic provisions for raw meat, meat preparations and manufactured meat from the time of live animal production up to the point of retail sale (Codex 2005)
- Codex guidelines on the application of general principles of food hygiene to the control of *L. monocytogenes* in foods *CAC/GL 61 – 2007* (Codex 2009) states:
  - For RTE foods in which growth of *L. monocytogenes* can occur the microbiological criterion for *L. monocytogenes* is n=5, c=0, m=absence in 25g
  - For RTE foods in which growth of *L. monocytogenes* cannot occur the microbiological criterion for *L. monocytogenes* is n=5, c=0, m=100 CFU/g

### Approach by overseas countries

Many countries, such as the European Union, the United States and Canada, have HACCP-based regulatory measures in place for meat products.

The risk of *L. monocytogenes* in dry/semi-dry fermented sausages has been classed as moderate and is primarily associated with product recontamination (FDA/USDA/FSIS 2003). The United States has a zero tolerance for *L. monocytogenes* in RTE products as required by the Code of Federal Regulation 9 CFR 430. Three alternative methods can be used to control *L. monocytogenes* contamination of post-lethality exposed RTE products: (i) apply a post-lethality treatment to reduce or eliminate *L. monocytogenes* and an antimicrobial agent or process to suppress or limit growth of *L. monocytogenes*; (ii) apply either a post-lethality treatment or an antimicrobial agent or process; or (iii) rely on its sanitation program to control *L. monocytogenes* (FSIS 2014).

The European Commission regulation on microbiological criteria for foodstuffs (No. 2073/2005) specifies that n=5, c=0, m=100 CFU/g as food safety criteria for *L. monocytogenes* in RTE foods other than those intended for infants and for special medical purposes. This criterion applies to products, such as uncooked RTE sausages, placed on the market during their shelf-life (European Commission 2005).

<sup>1</sup> New South Wales Food Authority, personal communication 9<sup>th</sup> October 2013

### Other considerations

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

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