Imported food risk statement
Uncooked ready-to-eat spreadable sausages and staphylococcal enterotoxin

Commodity: Uncooked spreadable sausages that are ready-to-eat (RTE). An example of this type of product includes some varieties of teewurst. Ambient stable sealed packages are not covered by this risk statement.

Microbial enterotoxin: Staphylococcal enterotoxin (SE)

Recommendation and rationale

Is SE in uncooked RTE sausages a medium or high risk to public health:

☑ *Yes*

☐ *No*

☐ *Uncertain, further scientific assessment required*

Rationale:

- Uncooked RTE spreadable sausages are not a conventionally fermented and cured meat product and the manufacturing process does not include a microbiological kill step. The low acidity and high moisture environment in the product also favours growth of *Staphylococcus aureus*. The products therefore pose a potential food safety risk if the raw ingredients became contaminated by pathogenic microorganisms such as *S. aureus*.
- There is a lack of literature on staphylococcal food poisoning attributed to the consumption of uncooked RTE spreadable sausages and a lack of microbiological survey data for *S. aureus* contamination in uncooked RTE spreadable sausages.

General description

Nature of the microbial enterotoxin:

Staphylococcus spp. is facultative anaerobic Gram-positive, non-spore forming spherical-shaped bacteria. They are commonly found in the environment, humans (nose and skin) and animals. Although several *Staphylococcus* species can produce SEs, including both coagulase-negative and coagulase-positive isolates, the majority of staphylococcal food poisoning (SFP) is attributed to SE produced by coagulase-positive *S. aureus* (FDA 2012; FSANZ 2013).

Growth of *S. aureus* can occur at temperatures between 7 – 48°C, pH of 4.0 – 10.0 and a minimum water activity of 0.83 when other conditions are near optimum. SEs are resistant to heat inactivation and cannot be destroyed by cooking. SEs remain stable under frozen storage (FSANZ 2013).

Adverse health effects:

SE is a moderate hazard as it generally causes illness of short duration and usually no sequelae (ICMSF 2002). People of all ages are susceptible to SFP. However, the severity of symptoms may vary depending on the amount of SE consumed and the general health status of individuals. The young and elderly are more likely to develop more serious symptoms (FSANZ 2013).

SFP is characterized by rapid onset gastroenteritis that appears around three hours after ingestion (normal range of 1 – 6 hours). Common symptoms of SFP include nausea, vomiting, abdominal cramps and diarrhea. Recovery is usually between 1 – 3 days (FSANZ 2013).

People become ill after exposure to very small quantities of SE (less than 1 µg). These levels of toxin are generally observed when *S. aureus* populations exceed 10^5 CFU/g of food (FDA 2012).

Consumption pattern:

Uncooked RTE spreadable sausages were not identified as being consumed by any of the respondents (2 years and over) in the 1995 National Nutrition Survey (McLennan and Podger 1999) or the respondents (2-16 years) in the 2007 Australian National Children's Nutrition and Physical Activity Survey (DOHA 2008).

Key risk factors:

Raw ingredients heavily contaminated with *S. aureus*, incorrect levels of added curing substance (nitrite and salt), and inappropriate combinations of time and temperature applied to the production of uncooked RTE spreadable sausages are key risk factors (MLA 2003). Other risk factors include a low acidity and high moisture environment in the product that favours the growth of *S. aureus*. Temperature abuse may allow growth of *S. aureus* to high levels and potential SE production.

Risk mitigation:

Time and temperature abuse of food products should be avoided by applying good temperature control practices during food manufacturing and handling. Good manufacturing practice and good hygienic practices in food manufacturing and handling also play a role in preventing SFP.

A high level of lactic acid bacteria in the product will inhibit the growth of *S. aureus* (Birzele et al. 2005).

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 the fermentation, maturation and smoking process of uncooked comminuted fermented meat. Standard 1.6.1 of the Code has a microbiological limit for all comminuted fermented meat which has not been cooked during the production process for coagulase positive staphylococci of n=5, c=1, m=10^3, M=10^4 per gram.

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 spreadable sausages.

There has been one notification on the European Commission's Rapid Alert System for Food and Feed (RASFF) for a high level of *S. aureus* in several undisclosed meat products from the Netherlands during the period of January 2007 – June 2013. It was not stated if any of these products were uncooked RTE spreadable sausage.

In the period of January 2007 – June 2013, there were no food recalls in Australia resulting from the presence of SEs or a high level of *S. aureus* in uncooked RTE spreadable sausages.

Surveillance information:

SFP is not a notifiable disease in Australia. While it is generally recognised that there may be significant underreporting of SFP due to the short duration of illness and self-limiting symptoms, there were two reported outbreaks in Australia in 2011 and two outbreaks reported in 2010. The foods associated with these outbreaks were thick shakes, rice noodles and mixed foods. Factors that contributed to the outbreaks included inadequate cleaning of equipment and temperature abuse of food. In Australia, it is estimated that *S. aureus* accounts for 1% of foodborne illness caused by known pathogens (OzFoodNet 2011; OzFoodNet 2012; FSANZ 2013).

Illness associated with consumption of uncooked RTE spreadable sausages contaminated with SE

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

Prevalence of *S. aureus* in uncooked RTE spreadable sausages

A literature search with the EBSCO Discovery Service did not find any data on the prevalence of *S. aureus* in uncooked RTE spreadable sausages in the period of 1990 – June 2014.

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)

Approach by overseas countries

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

The Canadian microbiological guidelines recommends *S. aureus* in raw fermented RTE sausages be limited to n=5, c=1, $m=2.5x10^2$, $M=10^4$ (Health Canada 2008).

Other considerations
Testing for high levels of coagulase-positive staphylococci is an indicator test for the presence of SE. Quarantine restrictions apply to certain products under this commodity classification. Refer to the ICON database.

This risk statement was compiled by FSANZ in: August 2014

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