Imported food risk statement
Ready-to-eat cooked chicken meat and staphylococcal enterotoxin

**Commodity:** Ready-to-eat (RTE) cooked chicken meat (stored chilled or frozen). This includes cooked chicken fillets or pieces that have been cut, sliced, diced, marinated or flavoured etc. Ambient stable sealed packages are not covered by this risk statement.

**Microbial enterotoxin:** Staphylococcal enterotoxin (SE)

<table>
<thead>
<tr>
<th>Recommendation and rationale</th>
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<td>Is SE in RTE cooked chicken meat a medium or high risk to public health:</td>
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<tr>
<td>☐ Yes</td>
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<tr>
<td>☑ No</td>
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<td>☐ Uncertain, further scientific assessment required</td>
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**Rationale:**
- Limited evidence for precooked RTE chicken meat being contaminated with high levels of *Staphylococcus aureus* or the presence of SE. Where Staphylococcal food poisoning was reported it occurred in a food service setting and was associated with infected food handlers and/or improper conditions (time/temperature).

**General description**

**Nature of the microbial enterotoxin:**
*Staphylococcus* spp. are 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 patterns:
Twelve percent of children (aged 2-16 years), 16% of adults (aged 17-69 years) and 13% of people aged 70 and above reported consumption of cooked chicken meat in the 1995 National Nutrition Survey (McLennan and Podger 1999). In the 2007 Australian National Children’s Nutrition and Physical Activity Survey, 33% of children (aged 2-16 years) reported consumption of cooked chicken meat (DOHA 2008).

Key risk factors:
Outbreaks of S. aureus food poisoning have been associated with consuming poultry meat, however, contributing factors generally included recontamination of cooked meat by food handlers and/or poor storage conditions, as identified in previous work performed by FSANZ (2005). Temperature abuse permits the growth of S. aureus in this commodity. The risk of S. aureus is higher in cooked products where the normal competitive spoilage flora has been destroyed, allowing growth of S. aureus and potential SE production if temperature abuse occurs.

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

In Australia Division 3 of Standard 4.2.3 of the Australia New Zealand Food Standards Code states that producers of RTE meat must implement a food safety management system which identifies, evaluates and controls food safety hazards.

Compliance history:
The only country currently permitted to import cooked chicken meat into Australia is New Zealand. The imported food compliance data sourced from the Imported Food Inspection Scheme of the Australian Department of Agriculture was provided for December 2008 – September 2011. The compliance data showed that for the 101 coagulase positive staphylococci tests applied to cooked chicken meat during this period there were no fails.

There has been one notification on the European Commission’s Rapid Alert System for Food and Feed (RASFF) for SE in chicken burger from Italy during the period January 2007 – June 2013; however it was not stated if the product was cooked or uncooked. There were no notifications for the presence of S. aureus.

There have been no food recalls in Australia due to the presence of SE or S. aureus in imported or domestically produced cooked chicken meat from January 2007 – June 2013.

Surveillance information:
SFP is not a notifiable disease in Australia. While it is generally recognised that there may be significant under reporting 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 RTE cooked chicken meat contaminated with SE
A literature search with the EBSCO Discovery Service did not identify any SFP outbreaks associated with consumption of precooked chicken meat in the period of 1990 – June 2014. There have been several outbreaks, such as those described by Hyeon et al. (2013) and Cowell et al. (2002), that were associated with chicken cooked by caterers and involved infected food handlers and/or improper storage temperatures.

1 Testing of cooked chicken meat from New Zealand was discontinued in 2011 under the Trans-Tasman Mutual Recognition Agreement
Prevalence of coagulase positive \textit{S. aureus} in RTE cooked chicken meat

Data on the prevalence of \textit{S. aureus} in RTE cooked chicken meat is limited.

- Survey in the United Kingdom in 2007, \textit{S. aureus} was not detected in sliced RTE cooked chicken meat samples at retail (n=402) (FSA 2011)
- Survey in the United Kingdom in 2003, \textit{S. aureus} levels were satisfactory (<20 CFU/g) or acceptable (20 to <10^2 CFU/g) in all packaged RTE chicken meat samples (n=495) (Sagoo et al. 2007)

Other relevant standards or guidelines

- \textit{FSANZ guidelines for the microbiological examination of ready-to-eat food} have a satisfactory level for coagulase positive staphylococci of <10^2 CFU/g. Food is deemed potentially hazardous if levels of coagulase positive staphylococci are ≥10^4 CFU/g or staphylococcal enterotoxin is detected (FSANZ 2001)
- Codex general principles of food hygiene \textit{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 \textit{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 poultry products.

Canada has microbiological guidelines for \textit{S. aureus} in deboned poultry products (precooked) of n=5, c=1, m=10^2, M=10^6 (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 products under this commodity classification and include specific time and temperature requirements which would be sufficient to inactivate \textit{S. aureus}, depending on country disease status; although pre-formed SE is not inactivated by cooking. Refer to the [ICON database](http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-food-monitoring.htm#07survey).

This risk statement was compiled by FSANZ in: August 2014

References


