20.09.2023

Imported food risk statement

Ready-to-Eat Dates and *Salmonella* spp.

Scope: Ready-to-eat (RTE) fresh, chilled, frozen, pitted and non-pitted dates.

Recommendation and rationale

Does *Salmonella* in imported RTE dates present a potential medium or high risk to public health:

☐ *Yes*

☑ *No*

Rationale:

- *Salmonella* spp. can be very infectious and cause incapacitating but not usually life-threatening illness. Sequelae can occur but are rare.
- There is currently no evidence linking *Salmonella* to food-borne illness associated with consumption of RTE dates.
- The method of primary production and processing can introduce contamination, and there is also the potential for post-processing contamination of the food. Where dates are washed and steamed as part of the cleaning and processing of the fruit, these steps are likely to reduce or eliminate *Salmonella* contamination at this point if an antimicrobial is added or contact temperatures are appropriate; however these will not prevent post-processing contamination particularly where manual methods are used.
- There is no evidence that dates can support the growth of *Salmonella,* but *Salmonella* spp. have the potential to survive in low moisture foods such as dates. Depending on the country of origin, production and processing of dates can be highly labour intensive, which could increase the risk of contamination by *Salmonella,* particularly where there is a lack of on-site sanitation facilities.

General description

Nature of the microorganism:

Salmonella spp. are facultative anaerobic Gram-negative, non-spore forming rod-shaped bacteria belonging to the Enterobacteriaceae family. The genus *Salmonella* is divided into two species: *S. enterica* (comprising six subspecies) and *S. bongori,* with over 99% of infections in humans caused by *S. enterica* subsp. *enterica* (Bell and Kyriakides 2002; Crum-Cianflone 2008). Over 2,500 serotypes of *Salmonella* spp. have been identified, which differ in their reservoir, host, growth characteristics and the severity of disease they cause. Some serotypes are host-specific, some are host-adapted, while others, such as *S*. Typhimurium, have a broad host range (Jay et al. 2003; Wallis 2006). *Salmonella* spp. colonise the intestinal tract of warm and cold-blooded vertebrates including livestock, wildlife and humans and also live in the surrounding environment (FSANZ 2013). *Salmonella* spp. are transmitted by the faecal-oral route, through consumption of contaminated food and water or from direct contact with infected people and animals (Jay et al. 2003).

Growth of *Salmonella* spp. can occur at temperatures ranging between 5.2–46.2°C, pH of 3.8–9.5 and a minimum water activity of 0.93 when other conditions are near optimum. The minimum pH for growth is dependent on temperature, presence of salt, nitrite and the type of acid present. *Salmonella* spp. can survive for months or even years in foods with a low water activity (ICMSF 1996; Podolak et al. 2010).

Adverse health effects:

Salmonella spp. cause incapacitating but rarely life threatening illness of moderate duration. Sequelae can occur but are rare. People of all ages are susceptible to salmonellosis, however, the elderly, infants and immunocompromised individuals are at a greater risk of infection and generally have more severe symptoms (FSANZ 2013).

General description
Salmonellosis symptoms include abdominal cramps, nausea, diarrhea, mild fever, vomiting, dehydration, headache and/or prostration. Onset of illness is typically 24–48 hours after exposure to an infectious dose (range of 8–72 hours) and usually lasts for 2–7 days. Severe disease such as septicemia sometimes develops, predominantly in immunocompromised individuals. A small number of individuals develop sequelae such as reactive arthritis, appendicitis, meningitis or pneumonia as a consequence of infection. The fatality rate for salmonellosis is generally less than 1% (FDA 2012; FSANZ 2013). The particular food matrix and strain of *Salmonella* spp. influence the level of *Salmonella* spp. required to cause illness. As few as one to 100 cells has been reported to cause illness. However, in most cases, significantly more cells are required for illness to occur (FDA 2012; ICMSF 1996).
Consumption patterns: In the 2011–12 Australian National Nutrition and Physical Activity Survey (ABS, 2014), 1.1% of older children (aged 6-16 years) and 2% of adults (aged 17 years and over) reported consumption of dates in some form (including eaten as RTE dried fruit or as an ingredient in mixed dishes or homemade baked goods). For both age groups, less than 1% reported consumption of RTE dried dates. Mean consumption of dried dates or in homemade baked goods by adults was 27 and 8.4 g/day/person respectively; with high consumption values reported as 115 and 45 g/day/person respectively. No reportable data (due to low reliability) was available for young children (aged 2-5 years) as less than 10 respondents confirmed consumption of dates in any form. The reported percentages are based on a single day of consumption information from the nutrition survey, and do not indicate the frequency of consumption of dates. It is likely that consumption of dates has increased in the years since the survey was conducted, driven by recognition of the nutritional value of dates for vulnerable population in particular and evidenced by the existence of a small but expanding Australian date production sector (AgriFutures, 2022).
Risk factors and risk mitigation Dates are the fruit of *Phoenix dactylifera* (commonly known as date palms), of which there are over 400 cultivars all producing edible fruits commercially. The most common varieties are the Mejool, Noor Deglet, Hayani, and Bahri depending on the importing country. Main exporters of dates in 2022 were Egypt (1.7 million tonnes), Saudi Arabia, Iran and Algeria; with most exports coming from the Middle East and Northern Africa (FAOSTAT, 2021). The USA does produce and export some dates (44.5 million pounds (19,866 tonnes) exported in 2021-22, with Australia noted as one of the top three importers, AgMRC, 2023), and there is limited domestic production in Australia (Agrifutures, 2022). Dates have high levels of sorbitol and fructose, with up to 80% sugar in ripe fruit. Ideal moisture content is approximately 23-25% to stop any loss of quality (eg colour and texture) and to prolong shelf-life. Dates are also high in fibre, phytochemicals and other essential nutrients (eg vitamins, amino acids and macro-minerals) with some studies showing that they are good source of nutrition as they are also easy to digest (reviewed in Oladzad et al, 2021). This factor increases the risk to vulnerable populations who may consume dates for their nutritional value. Food contamination can occur due to poor sanitary conditions, the use of non-potable water for processes such as washing of fruit and for equipment and hand hygiene. Thus fresh dates can potentially be contaminated with *Salmonella* at many points in the supply chain due to extensive handling of the fruit and from the water used for fruit washing, from primary production through to the point of consumption (Boxman et al 2012). To minimise contamination of dates with *Salmonella*, effective control measures are necessary during primary production and processing, e.g. through application of Good Agricultural Practices (GAP) on-farm and Good Hygienic Practices (GHP) at critical points in the supply chain (Codex 2017). Date production is quite labour-intensive, involving manual handling, although some places do use mechanisation to assist in production, harvest and processing. Both male and female plants are required for fruit production. Pollen is harvested by hand from the male flowers and sprayed onto the female flowers. Once fruit is set and fruits are thinned (generally by hand), the fruit-bearing fronds can be bagged. Ripe fruits (brown with a wrinkly surface) are either harvested by hand or collected from the bags and taken to a warehouse/shed for processing. Processing of the dates can include steps such as cleaning, grading, low-pressure steam heat treatment, sprinkling water and placing under mats in the sun, drying, fumigation, pitting, pasteurization, coating and packing. Dates are graded into 4 categories with high grade dates sold for eating as a RTE food and the lower grade dates used for production of date products. Although some mechanisation is used for parts of the process, many producers still use hand-pickers for inspection and packing of the highest graded products into boxes or alternatively the dates can be mechanically measured into containers by weight. Lower grade dates can be either bulk packed or further processed into products such as date juice, vinegars and pastes intended for use in food production.

General description
Dates can also be contaminated by the use of faeces-contaminated water for rinsing the fruit after harvesting. Potable water should be used for rinsing or cleaning of the fruit (Codex 2012). Water or low-pressure steam can be used during processing to soften the exterior surface of dates harvested from "hard date" cultivars. Further, a coating can also be applied to the surface of the fruit (eg wax, oil, sugar syrup, glycerol or sorbitol) to assist in shelf-life and fruit presentation (Kader and Hussein, 2009). RTE dates are often eaten raw or following minimal heat treatment; there is no specific pathogen elimination step applied during processing. *Salmonella* will survive but not grow on dried or frozen dates.
Surveillance information: Infection with *Salmonella* is a notifiable disease in all Australian states and territories. In 2022, the reported number of cases of salmonellosis was 10,347, with the highest number of reported cases occurring in the 0-4 year age group, this includes both foodborne and non-foodborne cases[1]. This is similar to the number of cases reported in 2021 (10,781; 41.7 cases per 100,000 population). The foodborne case rate is estimated to be 72% (90% Crl 53-86%) for domestically acquired *Salmonella*, non-typhoid cases in Australia (Kirk et al. 2014). The previous five year mean reported incidence rate was 60.1 cases per 100,000 population per year (ranging from 46.9–73.8 cases per 100,000 population per year; 2016-2020)[1]. It is anticipated that the global coronavirus disease pandemic would have contributed to the decrease in reported cases in 2021, due to very limited overseas travel (i.e. minimal cases of overseas acquired salmonellosis) and potentially less people seeking medical care. The most common *Salmonella* serovar identified in Australia in 2016 was *S*. Typhimurium (38% of cases) with a large range of other serovars accounting for the remaining cases (OzFoodNet, 2021). **Illness associated with consumption of RTE dates contaminated with *Salmonella*** A search of the scientific literature via EBSCO, US CDC Foodborne Outbreak Online Database and other publications from 2000 to January 2023 did not show any *Salmonella* outbreaks associated with consumption of dates from 2000 onwards. **Data on the prevalence of *Salmonella* in dates** A search of the scientific literature via EBSCO and other publications from 2000 to January 2023 identified no published prevalence surveys of dates for *Salmonella*.

Standards or guidelines
• The Codex general principles of food hygiene *CXC 1 – 1969* provides a framework of general principles for producing safe and suitable food for consumption by outlining necessary hygiene and food safety controls to be implemented through the food chain from primary production through to final consumption (Codex 2020). • The Codex code of hygienic practice for fresh fruit and vegetables *CXC 53-2003* addresses GAP and GHP that help control microbial, chemical and physical hazards associated with all stages of the production of fresh fruits and vegetables, from primary production to consumption. Annex I (Ready-to-eat, fresh, pre-cut fruits and vegetables) of *CXC 53-2003* recommends the application of GHP for all stages involved in the production of ready-to-eat, fresh, pre-cut fruits and vegetables, from the receipt of raw materials to the distribution and consumption of finished products (Codex 2017). Although RTE dates are generally consumed as whole fruits that are minimally trimmed, various coatings can also be applied to the surface of the fruit to assist in shelf-life and fruit presentation which may impact the risk of the microbial contamination – recommendations contained in Annex I would apply. • There are industry developed schemes to manage food safety in horticulture. These are audited by a third party against specific requirements. The main schemes used are the Harmonised Australian Retailers Produce Scheme (HARPS, 2022), and schemes that are internationally benchmarked to the Global Food Safety Initiative (GFSI; GFSI-Recognised Certification Programme Owners - MyGFSI) (FSANZ 2020). Further, Chapter 3 Standards (Food Safety Standards) of the *Australia New Zealand Food Standards Code* apply to food businesses (which includes food importers) that handle or sell horticultural produce. Some requirements in these Standards can apply to activities such as transport and pack house activities (as long as they are not considered to be "primary food production"). Some elements of traceability are also provided through food receipt and recall provisions of Standard 3.2.2, along with labelling requirements under Standard 1.2.2.

[1] Data on the number of salmonellosis cases provided by the National Interoperable Notifiable Disease Surveillance System with population data from the Australian Bureau of Statistics (accessed 25 March 2022)

Management approaches used by overseas countries
The European Food Safety Authority (EFSA) recommends good hygiene, manufacturing and agricultural practices in food producing countries. The *European Commission Regulation (EC) No 852/2004 – Annex 1 Part A: General hygiene provisions for primary production and associated operations* outlines general provisions for the hygienic production of food, including fresh produce. This includes requirements on water use; health and hygiene of food handlers; cleaning and sanitising of facilities, equipment and vehicles; animal and pest exclusion; storage of waste; and the use of biocides (EU 2004). Fresh fruit or vegetables imported into Canada must meet Canadian requirements as set out in the *Safe Food for Canadian Regulations* as well as the *Food and Drug Regulations*. Some products, such as Guatemalan raspberries, are associated with elevated food safety risks and have specific import requirements to minimize potential hazards (CFIA 2019a). Under Section 8 of the *Safe Food for Canadian Regulations* food that is imported, exported or inter-provincially traded must not be contaminated; must be edible; must not consist in whole or in part of any filthy, putrid, disgusting, rotten, decomposed or diseased animal or vegetable substance; and must have been manufactured, prepared, stored, packaged and labelled under sanitary conditions (CFIA 2019b). In the US the Produce Safety Rule of the *Food Safety Modernization Act* established science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption. This includes requirements for water quality; biological soil amendments; sprouts; domesticated and wild animals; worker training and health and hygiene; and equipment, tools and buildings (FDA 2019b). The USDA has aligned the Harmonized Good Agricultural Practices Audit Program (USDA H-GAP) with the requirements of the FDA Food Safety Modernization Act's Produce Safety Rule. While the requirements of both programs are not identical, the relevant technical components in the FDA Produce Safety Rule are covered in the USDA H-GAP Audit Program. However, the USDA audits are not regarded as a substitute for FDA or state regulatory inspections (FDA 2019a).

This risk statement was compiled in: September 2023

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