20.09.2023

FOOD STANDARDS Australia New Zealand
Te Mana Kounga Kai – Ahitereiria me Aotearoa

Imported food risk statement

Ready-to-eat Dates and Hepatitis A virus (HAV)

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

Recommendation and rationale

Does hepatitis A virus (HAV) in imported RTE dates present a high risk to public health that may require additional management measures:

☑ *Yes*

☐ *No*

Rationale:

- HAV is a serious hazard as it causes incapacitating illness of moderate duration which, in rare cases, can be life threatening. It is very infectious, with small quantities likely to cause infection.
- There is strong evidence that HAV has caused foodborne illness from consumption of contaminated fresh dates, which may have been dried or further processed .
- The method of primary production and processing can introduce contamination through manual handling, and there is also the potential for post-processing contamination of the food. No processing steps used are likely to reduce or eliminate HAV contamination for fresh RTE whole dates that are typically eaten raw.
- Although HAV cannot replicate in food, it is a robust virus and is likely to survive for extended periods of time on the surface of fresh, chilled, or frozen RTE dates; therefore HAV could be present at the time of consumption.
- In Australia, HAV is uncommon and, whilst vaccination is available, there is a low overall seroprevalence in the population. As a result of this, a significant proportion of the Australian population are susceptible to foodborne transmission of HAV.

General description

Nature of the virus:

Hepatitis A (HAV) belongs to the Picornaviridae family of viruses. It is a small (25–28 nm) non-enveloped icosahedral virus with a single stranded RNA genome. Like all viruses, HAV can only multiply in living host cells and cannot replicate in food or in the environment. However, the virus can survive in food and still be present at the point of consumption. The virus can survive in the environment and is considered to be extremely stable under a wide range of environmental conditions, including drying, freezing and heating (Codex 2012; FDA 2012; FSANZ 2013; Hollinger and Martin 2013).

The host range of HAV is limited to humans and non-human primates (Hollinger and Martin 2013). In humans, HAV is transmitted via the faecal-oral route by either person-to-person contact or consumption of contaminated food or water (FSANZ 2013).

HAV replicates in the liver before being released into the small intestine via the bile duct and subsequently shed in highest concentrations in faeces. Peak levels of HAV shedding in faeces occurs in the two weeks prior to the onset of clinical symptoms (up to 10^9 infectious HAV particles per gram of faeces) (Hollinger and Martin 2013; Wasley et al. 2010). Asymptomatic and symptomatic infected persons are generally unaware they present a hazard at the time most virus is shed in faeces (FSANZ 2013).

Resistance of HAV to heating (e.g. application of low pressure steam heat treatment of dates) is variable and highly dependent on the virus strain, initial level of contamination, time and temperature of heating and the type of food matrix (Bidawid et al. 2000; Codex 2012; FSANZ 2013). Also, increasing the concentration of sugar increases the resistance of HAV to heating (Deboosere et al. 2004). Cooling and freezing processes are not considered suitable for the control of viruses as they do not reduce virus infectivity to levels considered safe. In studies on enteric viruses on berries and herbs, Butot et al. (2008; 2009)

General description
showed that both freeze-drying and frozen storage for up to 90 days at -20°C had negligible effect on the infectivity of HAV, with less than 1 Log reduction achieved on most products. In addition, HAV is not readily inactivated by drying or desiccation (Cliver 2009; Sanchez and Bosch 2016). .

Adverse health effects:

HAV is a serious hazard as it can cause incapacitating illness of moderate duration which, in rare cases, can be life threatening. Symptoms associated with HAV infection include fever, nausea, anorexia, malaise, vomiting, diarrhea, muscular pain and often jaundice. Jaundice generally occurs five to seven days after the onset of gastrointestinal symptoms. Illness typically occurs 15–50 days after infection and HAV is shed in the faeces up to two weeks before, and for several weeks after, onset of illness. The duration of illness is typically one to two weeks, although prolonged or relapsing cases may continue for up to six months in a minority of patients (FDA 2012; FSANZ 2013). Note that some infected people will be asymptomatic with older children and adults more likely to have symptoms than children under six years (FDA 2012).

People of all ages are susceptible to HAV infection unless they have immunity from a previous infection (which provides lifelong protection against reinfection) or vaccination (after which, anti-HAV antibodies persist for at least 20 years) (CDC 2019). The disease is milder in young children under six years, with many cases being asymptomatic. HAV infection in people over 40 years can have a more severe disease outcome. In rare cases, HAV infection can lead to acute liver failure which can be fatal (Codex 2012; FDA 2012; FSANZ 2013).

The infectious dose of HAV is considered to be 10–100 viral particles (FDA 2012).

In Australia hepatitis A is uncommon and there is a low overall seroprevalence in the population, which means a significant proportion of the Australian population are susceptible to foodborne transmission of HAV.

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 producers of dates in 2022 were Egypt (1.7 million tonnes), Saudia Arabia, Iran and Algeria; with most exports coming from the Middle East and Northern Africa (FAOSTAT, 2021). The USA produces and exports dates (44.5 million pounds (19,866 tonnes) in 2021-22), with Australia one of the top three importers (AgMRC, 2023). 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.

Fresh dates can potentially be contaminated with HAV at many points in the supply chain due to extensive handling of the fruit from primary production through to the point of consumption (Boxman et al 2012). To minimise contamination of dates with HAV, 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).

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Date production is quite labour-intensive, involving manual handling, although some places 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 fresh 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. Dates can also be contaminated by the use of HAV-contaminated water for rinsing the fruit after harvesting. Potable water should be used for rinsing or cleaning of the fruit (Codex 2012; Fiore 2004). 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). HAV is endemic in many of the countries exporting dates. HAV can be transmitted person-to-person or via contaminated food products. Food contamination occurs due to poor sanitary conditions and hand hygiene; with the transfer of HAV from infected persons to the food product or environment during handling. This is most likely to occur in countries where HAV is endemic, particularly given that HAV can be transmitted for up to two weeks prior to onset of symptoms. Appropriate control measures include providing adequate sanitation and hand washing facilities for field workers and those involved in processing and packaging of the fruit (Codex 2012, 2017; Fiore 2004). There is no evidence available at this time to suggest that any specific step in current processing methods would remove or inactivate HAV once on the fruit. Application of steaming is used to soften the outer layers of the hard date serovars to improve their texture, whilst drying concentrates the sugars in the fruit – neither of these would be sufficient to mitigate the risk of HAV contamination. RTE dates are often eaten raw or with minimal steam heat treatment, so there is no pathogen elimination step applied during processing. There are currently no effective, realistic and validated risk management options to eliminate viral contamination of fresh produce prior to consumption without changing the normally desired characteristics of the food (Codex 2012). Imported dates from countries where HAV is endemic into countries with low endemicity may result in higher likelihood of severe symptomatic illness developing in adults due to lower levels of immunity (Boxman, 2012).
Surveillance information: HAV is a notifiable disease in all Australian states and territories, with a notification rate in 2020 of 0.3 cases per 100,000 population (86 cases). This was a substantial decrease from the previous five year mean of 1.0 case per 100,000 population per year (ranging from 0.6–1.7 cases per 100,000 population (NNDSS 2021). The reported notification rate includes both foodborne and non-foodborne transmission. Historically, the majority of HAV cases in Australia have been acquired overseas (OzFoodNet 2015, 2018). However due to the global pandemic in 2020 there was very limited overseas travel, which is anticipated to have contributed to the drop in reported Australian HAV cases. In 2022 the total number of cases had risen from 25 in 2021 to 142 in 2022 (NNDSS, 2023). **Illness associated with consumption of RTE dates contaminated with HAV** A search of the scientific literature via EBSCO, US CDC Foodborne Outbreak Online Database and other publications from 2000 to January 2023 identified there have been three HAV outbreaks associated with consumption of dates from 2000 onwards and these are listed below: • December 2017-February 2018 – reported in Denmark and Norway with 31 cases notified with 22 hospitalized (No 11 - 2018 (ssi.dk)). The source was identified as fresh dates (92% cases reported eating dates) imported from one producer in Iran. Date samples were found to be positive with the same strain of HAV in a study undertaken in 2020 (Rajiuddin et al 2020).

General description

- January-April 2021 – reported in the UK (England and Wales) with 29 cases (Garcia Vilaplana et al 2021) of >75% were hospitalised. Investigation findings indicated that fresh dates imported from Jordan were the likely source. Dates from two cases were found to be positive for the presence of HAV but there was no sequence confirmation.
- June to September 2021 – reported in Australia with 6 cases of which 4 were hospitalised. Genome sequencing confirmed a link to the HAV outbreak in the UK. 2 of the three cases reported eating specific date products imported from Jordan. HAV was also detected in Medjool dates obtained from retail in Australia and these specific date products were identified as the source of the outbreak and a customer-lead recall was carried out. Furthermore, sequencing confirmed that the cases of HAV illness were caused by a HAV strain endemic in Jordan (O'Neill et al, 2022).

An older analysis by EFSA (2014) for the period 1999-2013 reported multi-national outbreaks of HAV in Europe with 8 European member states making 35 RASFF notifications of HAV detected in strawberries, semi-dried tomatoes, shellfish and dates. EFSA noted that the outbreak cases were still being reported beyond this report with multiple outbreaks occurring across the EU. Due to the complexity of the EU, and the complexity of food distribution within the EU no specific producers or countries were implicated for outbreaks associated specifically with dates. ESFA note that there has been a reduction in the cases notified since 1999, which they attribute to improvement in socio-economic status of EU countries with a lowering of susceptible population and improved GHP procedures, including surveillance, investigations and risk assessment.

Data on the prevalence of HAV in RTE dates

A search of the scientific literature via EBSCO and other publications from 2000 to January 2023 identified one survey containing prevalence data for HAV detection on whole dates.

- Boxman et al 2012 – 185 dates samples collected from retail outlets in the Netherlands (imported from at least 12 countries) between June 2009 and November 2010 were tested by RT-PCR for HAV. Of the 169 samples which met the inclusion criteria only one was positive (with an equivalent to 15 genome copies per 30g dates). Four additional sub-samples of the positive product were tested for the presence of HAV, and two were positive.
  Additional sampling of dates from another company specifically linked to a clinical case – 2 of 5 samples were positive but below the limit of detection of 2.5×10^3 HAV copies in 30g of dates.

Standards or guidelines

- 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 2020).
- Codex code of hygienic practice for fresh fruit and vegetables *CXC 53-2003* addresses Good Agricultural Practices and Good Hygienic Practices 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 (Codex 2017; FSANZ 2019). Although RTE dates are generally consumed as whole fruit 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.
- Guidelines on the application of general principles of food hygiene to the control of viruses in food *CAC/GL 79-2012* provides guidance on how to prevent or minimise the presence of human enteric viruses in foods, and more specifically norovirus and HAV in food (Codex 2012).
- 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.

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 fruit 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: August 2023

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