Scombroid Poisoning Associated with Commercially Distributed Tuna

October – December Hennepin County

On October 22, November 9, and December 9, 2020, the Minnesota Department of Health (MDH) foodborne and waterborne illness hotline received independent complaints of an individual with illness after consuming sushi made with spicy tuna purchased from Restaurant Chain A in Edina. The symptoms and incubations reported were consistent with scombroid poisoning. The City of Edina Environmental Health was contacted after each complaint, the Minnesota Department of Agriculture (MDA) was notified, and a more extensive investigation was initiated after the third complaint.

Callers to the MDH foodborne and waterborne illness hotline are interviewed with a standard questionnaire that, when relevant, includes symptoms consistent with scombroid poisoning and collects information on brand and other details for retail food products.

A case was defined as a Restaurant Chain A - Edina patron who developed symptoms consistent with histamine toxicosis (i.e., rash, headache, dizziness, nausea, vomiting, diarrhea, facial flushing and sweating, itching skin,

and tingling and burning sensations around the mouth) within 3 hours of eating a menu item containing spicy tuna.

Environmental Health specialists from the City of Edina visited the restaurant on October 23, November 11, and December 14 to review food handling procedures and temperature flow for tuna, gather invoices, embargo food for testing, and provide information and next steps based on food testing results.

The MDH Foodborne Diseases Unit requested and on February 1, 2021 Restaurant Chain A corporate provided lists of patrons who ordered take-out online or made dine-in reservations. They were unable to provide delivery order information. On February 2, an electronic REDCap survey was sent to patrons with email addresses available who ate at the restaurant during October, November, and December (based on "last ordered date" for online orders). The survey included questions regarding food eaten from Restaurant Chain A – Edina (specifically tuna-containing menu items) and illness history following the meal.

On December 10, MDA picked up two samples of tuna for histamine testing at the MDA Chemistry Laboratory. The samples included a prepared pan of spicy tuna and an unopened thawed block of ground tuna that were set aside by the restaurant from the same or a similar lot to product that would have been served on the December 7 meal date.

MDA conducted an investigation at Distributor X in Minneapolis, the tuna distributor for Restaurant Chain A - Edina, which included additional product testing, and notified the United States Food and Drug Administration (FDA).

Cases/Patrons

Electronic surveys were sent to 425 patrons; 68 (16%) responses were received. Among the respondents, 27 reported eating a menu item containing spicy tuna. Meal dates for these 27 ranged from October 17 through December 4. Twenty-one were take-out orders, 5 sit-down, and 1 delivery. Five individuals who ate spicy tuna reported illness, of which two met the case definition.

A total of five cases were identified, three from the original complaints and two from the electronic survey. Meal dates were October 19 (complaint), November 4 (complaint), November 6, December 7 (complaint), and December 13. Incubation periods ranged from 30 to 120 minutes (median, 90 minutes). All three complainants reported red/flushed face, rash or hives, and headache in addition to other symptoms. The survey cases both reported red/flushed face, and one also reported diarrhea and stomach cramps. All five cases consumed sushi rolls made with spicy tuna. One individual sought healthcare in an emergency room for the symptoms. Minnesota restaurants were closed for in-person dining by executive order during November 21 through December 18 because of the COVID-19 pandemic. At least two of the complainant orders were delivery orders, one survey case had dine-in, and one survey case had take-out.

Environmental Health

Spicy tuna served in the restaurant was prepared from a frozen, vacuum-packed ground tuna product (0705) received from the distributor several times per week. According to the restaurant, ground tuna served on the last complainant's meal date (December 7) was received on December 4, thawed December 4 and 5, and prepped on December 5. The restaurant reported that tuna was only thawed in the walk-in cooler or under cold running water. Pans of prepared tuna were kept for 3 to 4 days.

No issues with temperate storage or handling of the tuna were identified during the environmental health assessments. During the November 10 visit, two pans of tuna in the walk-in cooler measured 37° F.

All three complainants had also called the restaurant to report their complaint; however, none were reported to MDH by the restaurant. One complainant stated that the restaurant told them their symptoms were likely caused by cross-contamination of sushi from jalapeno peppers. Restaurant management were reminded that

all foodborne illness complaints are required to be reported to public health, and a fact sheet on scombroid poisoning was provided to the restaurant for staff training. The restaurant was reminded to be extra vigilant for complaints consistent with scombroid poisoning, and if received, to immediately discard all prepped tuna and report to their health inspector or MDH.

Several risk reduction recommendations were provided to the restaurant, including: strict temperature controls during storage, thawing, and preparation of tuna; checking transit temperatures upon receipt of incoming product shipments; not making tuna rolls with warm rice; considering cold-holding for tuna items awaiting delivery; and, asking delivery services to cold-hold tuna items during delivery.

An observer reported that the walk-in cooler door at Restaurant Chain A-Edina was left open during operation frequently, creating a pass-through walkway. This was not observed during the environmental assessments.

Restaurant Food Testing

On December 14, results from the MDA Chemistry Laboratory indicated that the unopened sample of tuna from the restaurant's supplier contained 475 ppm histamine, and a sample of the same tuna that had been prepared in the restaurant (thawed, and several ingredients added) had 3,980 ppm histamine (Table 1). According to the FDA, "the presence of 50 ppm (5 mg/100 g) or more histamine is indicative of decomposition" in tuna fish, and levels above 50 ppm are considered adulterated and unacceptable. The restaurant was notified and asked to immediately stop using this product and temporarily switch suppliers.

Table 1: tuna testing results

Source	Sample	Histamine mg/100g	Histamine ppm
Chain A	1 (raw, unopened)	48 mg/100g	475 ppm
	2 (raw, prepared)	398 mg/100g	3980 ppm
Distributor X	1 (raw, unopened)	0 mg/100g	4 ppm
	2 (raw, unopened)	1 mg/100g	12 ppm
	3 (raw, unopened)	2 mg/100g	18 ppm
	4 (raw, unopened)	3 mg/100g	25 ppm
	5 (raw, unopened)	3 mg/100g	27 ppm
	6 (raw, unopened)	6 mg/100g	63 ppm
	7 (raw, unopened)	10 mg/100g	97 ppm
	8 (raw, unopened)	17 mg/100g	173 ppm
	9 (raw, unopened)	21 mg/100g	214 ppm
	10 (raw, unopened)	25 mg/100g	246 ppm

On December 15, a notification email was sent by MDH Environmental Health to health inspectors with other Minnesota Chain A restaurant locations in their jurisdiction; the email had information regarding the investigation and asked inspectors to notify restaurants to immediately stop using tuna from Distributor X and switch suppliers, if applicable. Restaurant Chain A reported that not all restaurants use tuna from the same supplier.

Traceback

On December 22, an MDA inspector visited Distributor X, conducted an inspection, obtained manufacturer information, and collected 10 samples of the frozen ground tuna that was supplied to Restaurant Chain A. The tuna is received at Distributor X frozen and is kept frozen during distribution. No issues were observed at the distributor.

On December 29, results from the tuna samples collected at the distributor had histamine levels ranging from 4 ppm to 246 ppm; 5 of 10 samples tested were above the allowable level (Table 1).

Distributor X reported that they started notifying customers not to use the adulterated tuna and hold it for return on December 30 after receiving the laboratory results. An official recall was issued on December 31. On January 5, 2021, an MDA Inspector embargoed the remaining tuna product for destruction at Distributor X.

Invoices collected at Distributor X identified Distributor Y of California as the source of tuna shipped to Distributor X. Distributor Y obtained the product, which was sourced from Vietnam, from Supplier A of California. These findings and sample results were shared with FDA, who dispatched investigators to the facility in California. Distributor Y initiated a recall on the Supplier A product in January 2021.

This was a foodborne outbreak of scombroid fish poisoning associated with commercially distributed frozen ground tuna with elevated levels of histamine, sourced from Vietnam. There were no reported cases in other states – the Minnesota cases all consumed tuna from one sushi chain restaurant location. No temperature storage or handling issues were identified at the restaurant or the distributor. A recall was issued by the distributor and upstream supplier. The source of adulteration was most likely at the supplier/manufacturer level, based on elevated levels of histamine in tuna received at the distributor. However, since no additional scombroid poisoning cases were reported from other customers who received the tuna product, and histamine levels were much higher in a sample of prepared product collected at the restaurant, it is possible practices at the restaurant further contributed to high histamine levels. Disruptions of international supply chains due to the COVID-19 pandemic may have contributed to this outbreak.

References

1. CPG Sec 540.525 Decomposition and Histamine Raw, Frozen Tuna and Mahi-Mahi; Canned Tuna; and Related Species. https://www.fda.gov/regulatory-information/search-fda-guidance-documents/cpg-sec-540525-decomposition-and-histamine-raw-frozen-tuna-and-mahi-mahi-canned-tuna-and-related [Accessed March 12, 2021]
2. FDA Recall Enforcement Report. https://www.accessdata.fda.gov/scripts/ires/index.cfm?Product=185332 [Accessed March 15, 2021]