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## 鯖魚中毒

## Scombrototoxin Fish Poisoning

食物安全中心風險評估組  
科學主任林漢基博士報告

Reported by Dr. John LUM, Scientific Officer,  
Risk Assessment Section, Centre for Food Safety

食物安全中心(食安中心)在2022年10月接獲衛生防護中心通報一宗涉及吞拿魚柳的懷疑鯖魚中毒個案，並抽取相關食物的樣本進行化驗。結果顯示，一個急凍吞拿魚柳樣本被檢出含有組胺，含量可引致食物中毒反應。有關進口商、供應商及食肆已按中心指示停售及棄置相關食品。該進口商亦已展開回收。食安中心發現，本地鯖魚中毒個案由2018年及2019年沒有錄得個案，到2020年、2021年及2022年(截至11月為止)分別錄得一宗、兩宗和四宗個案，數目有輕微上升趨勢。

The Centre for Food Safety (CFS) received notification from the Centre for Health Protection of the Department of Health in October 2022 of a suspected scombrototoxin fish poisoning (SFP) case involving tuna fillet, and took samples of the incriminated food for testing. Test results showed that a frozen tuna fillet sample contained histamine at a level which can cause food-borne intoxication. The importers, suppliers and restaurant concerned followed the CFS's advice to stop sale and to discard the affected product. The importer had also initiated a recall. The CFS also observes a slight increase in SFP locally, with one, two and four cases in 2020, 2021 and 2022, as at November 2022, respectively, compared to no recorded cases in 2018 and 2019.

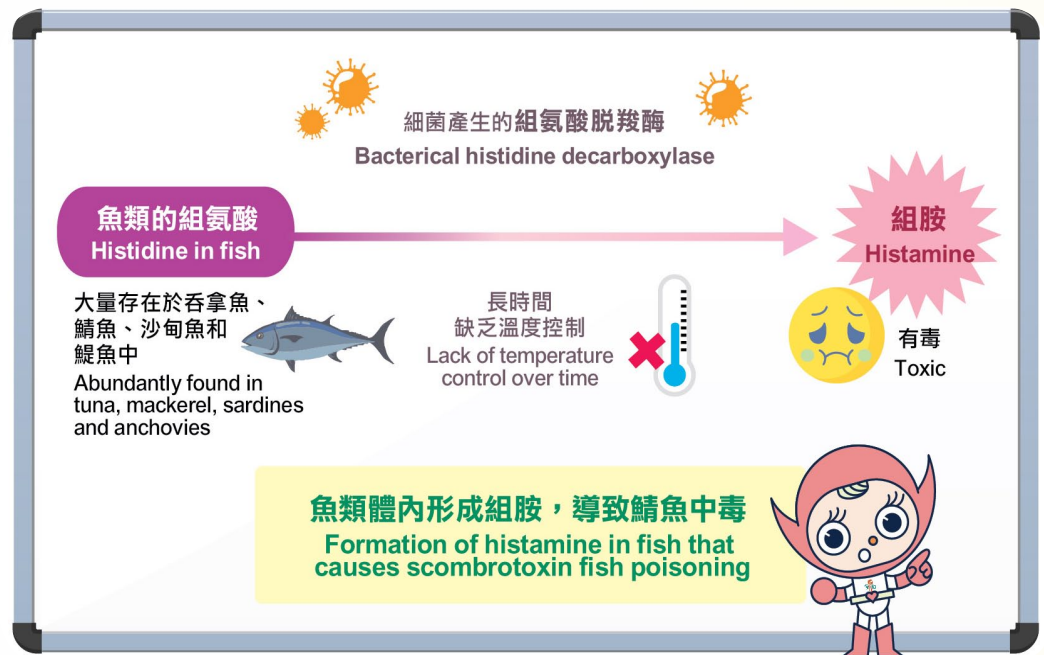


圖1：不適當的溫度引致組胺產生

Figure 1: Formation of histamine in fish due to temperature abuse

### 什麼是鯖魚中毒？

鯖魚中毒又稱「組胺中毒」，由進食含大量組胺的魚類引起。涉及鯖魚中毒的魚類通常在魚類組織內含有大量氨基酸組氨酸，包括吞拿魚、沙甸魚、鯷魚、鯧魚、希靈魚(鱈魚)、旗魚、藍魚(扁鰆)、三文魚(鮭魚)、油甘魚(鰺魚)及劍魚等。魚類在捕獲後，若處理及貯存度不當，部分屬於魚類自然菌羣的細菌便會繁殖。這些細菌的「組氨酸脫羧酶」會把「組氨酸」轉化為組胺(圖1)。組胺可在從捕魚到進食等各個食物供應鏈程序中形成。其他由魚類中細菌產生的生物胺或會加劇組胺的毒性。

### What is Scombrototoxin Fish Poisoning?

Scombrototoxin fish poisoning, also called "histamine poisoning", is caused by ingestion of fish containing high levels of histamine. The fish species involved in SFP usually contain high levels of the amino acid histidine in their tissues, include tuna, sardines, anchovies, mahi-mahi, herring, marlin, bluefish, salmon, yellowtail and swordfish. After harvesting, when fish is handled and stored at inappropriate temperature, bacteria that are part of the natural microflora of the fish will multiply. The bacterial enzyme, histidine decarboxylase, converts histidine into histamine (Figure 1). Histamine could be formed along the food chain from harvesting to consumption of the fish. Other biogenic amines produced as a result of bacterial growth in fish may potentiate the toxicity effect of histamine.

雖然熱處理(例如烹煮、熱熏)能殺死製造組胺的細菌，並使製造組胺的酶失去活性，但組胺本身非常耐熱，一旦在食物中形成，即使烹煮、入罐或冷凍也不能將之破壞。儘管受組胺污染的魚可能帶有金屬異味、惡臭及魚肉變色，但部分受污染的魚的外觀、氣味和味道也可能全無異常，因此不能依靠感官評估就確保魚肉不含組胺。

### 鯖魚中毒的症狀

鯖魚中毒的病人會出現一種或多種症狀，包括口腔附近出現刺痛和灼熱感、面部潮紅、出汗、噁心、嘔吐、頭痛、心悸、頭暈和皮疹。症狀一般於進食受污染魚類後5分鐘到2小時出現，通常維持8至12小時。雖然鯖魚中毒的症狀可持續數天，但並無已知的後遺症。因鯖魚中毒而致命的個案非常罕見。

### 組胺的風險評估

聯合國糧食及農業組織/世界衛生組織認為，若攝入多於50毫克組胺，便可出現急性鯖魚中毒症狀。組胺通常在數小時內便會從人體排出，因此連續多餐吃魚亦不會造成累積效應。

### 鯖魚中毒的預防措施

魚及魚製品長時間在不當的溫度下處理及貯存，經過細菌的作用才會令大量的組胺形成。因此，魚類死後必須立即冷凍，而從捕魚到進食的整個食物鏈亦必須維持冷鏈完整。冷凍(冰鮮)魚及魚製品應貯存於攝4度或以下，冷藏(急凍)製品則應貯存於攝氏零下18度或以下(圖2)。煮熟的魚和即食魚製品(如吞拿魚三文治和已開罐的罐頭魚)可能會再被細菌污染，如非即時食用，應存放於雪櫃內。切勿在室下解凍冷藏魚類，此舉會促使組胺產生；冷藏製品應妥為解凍，如利用雪櫃保鮮格、把魚放在流動的自來水或微波爐內解凍。

食安中心發出了《預防鯖魚中毒的食物安全建議》，為業界和消費者提供詳細預防鯖魚中毒的方法。

### 注意要點

- 鯖魚中毒是因進食含大量組胺的魚類所致。
- 組胺耐熱，不受烹煮、入罐或冷藏影響。
- 在不當的度及時間下貯存及處理魚及魚製品，可產生大量組胺。

### 給市民及業界的建議

- 從可靠及衛生的來源購買魚及魚製品。不要購買或食用有任何變壞跡象(包括異味、組織分解或魚肉變色)的魚類。
- 冷凍的魚及魚製品應貯存於攝4度或以下，冷藏製品則應貯存於攝氏零下18度或以下。
- 冷藏製品應妥為解凍，切勿在室下解凍，此舉會促使組胺產生。

Although heat treatments, such as cooking and hot smoking, can kill histamine-producing bacteria and inactivate histamine producing enzyme, histamine by itself is heat stable. Once formed, histamine cannot be destroyed by cooking, canning or freezing. Though histamine-contaminated fish may have a metallic off-flavour, a bad odour and a discoloured appearance, some of the fish may appear, smell and taste normal. Therefore, it is not possible to rely on sensory assessment to ensure the absence of histamine in fish.

### Symptoms of Scombrototoxin Fish Poisoning

Individuals suffering from SFP may show one or more symptoms including tingling and burning sensation around the mouth, facial flushing and sweating, nausea, vomiting, headache, palpitations, dizziness and rash. Symptoms typically develop rapidly, from 5 minutes to 2 hours after ingestion of contaminated fish, with a usual duration of 8 - 12 hours. Although symptoms of SFP may persist for up to several days, there are no known long-term sequelae. SFP is considered to be rarely, if ever, fatal.

### Risk Assessment of Histamine

FAO/WHO considered that a person exposed to more than 50 mg of histamine may exhibit symptoms for acute histamine intoxication. No cumulative effect of consecutive meals containing fish is expected, because histamine usually leaves the body within a few hours.

### Preventive Measures for Scombrototoxin Fish Poisoning

High histamine levels are a result of bacterial action due to temperature-time abuse where fish and fishery products are handled or stored in inappropriate temperature over a prolonged period of time. As such, fish should be chilled immediately after death, and cold chain should be maintained from harvest to consumption. Chilled fish and fishery products should be stored at 4°C or below, while frozen products should be stored at -18°C or below (Figure 2). Cooked fish and ready-to-eat fish products (e.g. tuna sandwiches and opened canned fish) can be re-contaminated by histamine forming bacteria, and should be kept under refrigeration if they are not consumed immediately. Do not defrost frozen fish at room temperature as it facilitates histamine production. Instead, frozen products should be defrosted properly, such as by making use of a refrigerator compartment, putting fish under running tap water or thawing fish in a microwave oven.

The CFS has issued a [Food Safety Advice on Prevention of Scombrototoxin Fish Poisoning](#), detailing preventative measures of SFP for traders and consumers.

### Key Points to Note

- SFP is caused by eating fish containing high levels of histamine.
- Histamine is heat stable and would not be affected by cooking, canning or freezing.
- High histamine levels in fish and fishery products are a result of temperature-time abuse during handling and storage.

### Advice to the Public and the Trade

- Purchase fish and fishery products from reliable and hygienic sources. Do not purchase or eat fish with any sign of spoilage, such as off-odour, texture breakdown and discoloured flesh.
- Chilled fish and fish products should be kept at 4°C or below, while frozen products at -18°C or below.
- Frozen products should be defrosted properly, and never at room temperature as it facilitates histamine production.

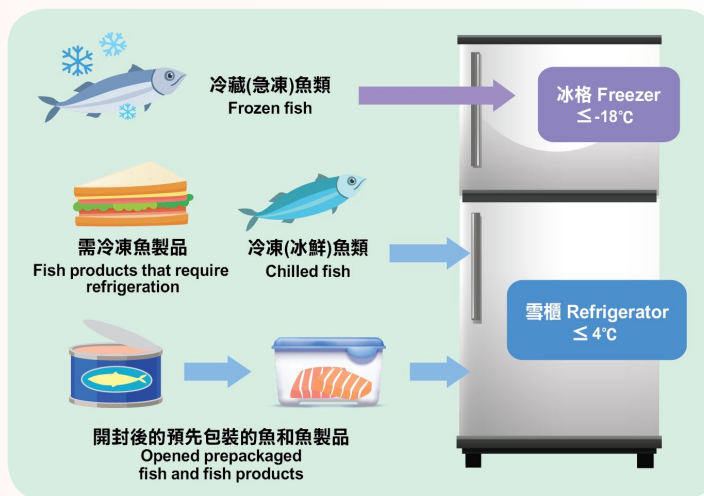


圖2. 避免鯖魚中毒，魚及魚製品應貯存於適當的度  
Figure 2: To prevent scombrototoxin fish poisoning, fish and fish products should be kept at appropriate temperature.

# 認識微生物風險，吃蠔吃得安全

## Oysters: Know the Microbiological Risk and Eat Safely

食物安全中心風險傳達組  
科學主任陳蓉蓉女士報告

Reported by Ms. Melva CHEN, Scientific Officer,  
Risk Communication Section, Centre for Food Safety

食物安全中心(食安中心)在2022年11月就四宗涉及進食生蠔的食物中毒個案展開調查。其中兩宗個案合共涉及在一家餐廳內進食的六人、一宗涉及另一家餐廳的10人以及另一宗涉及參與同一場宴會的23人。患者均出現腹痛、腹瀉、噁心和嘔吐等腸胃症狀。

食安中心一直致力讓市民認識進食生蠔的風險。然而，從我們進行的[食物消費量調查](#)可見，生蠔越來越受市民歡迎。與此同時，近期本港涉及生蠔的食物中毒事故有所增加，在2021年有超過100宗，對比2016年至2020年間，每年平均有約25宗。消費者應認識生蠔存有的食物安全風險，因為生蠔並沒有經過熱處理以殺死有害微生物。

### 蠔隻的微生物風險

蠔是濾食性動物，會集中大量海水中的微生物，容易受弧菌、諾如病毒及甲型肝炎病毒等有害微生物污染。此外，人們可以通過進食生或未煮熟的蠔感染具有抗菌素耐藥性的微生物(「超級細菌」)。無論「超級細菌」有否引致疾病，都可能將抗菌素耐藥性基因轉移到人體內其他細菌，因而影響日後需要使用的抗生素藥效。

到目前為止，也並無技術可以確保所有生蠔均不含微生物危害。採取自糞便污染程度受監控區域的進口生蠔，有時也會被海外當局驗出含諾如病毒，或者被發現與本地及海外的食物中毒個案有關。雖然大部分受影響的人士病情屬輕微，但食用生蠔也有可能導致健康嚴重受損，尤其是對孕婦、幼兒、長者和免疫力弱人士等高危人士。

要減低食物中毒的風險，最好把蠔徹底煮熟至中心度達攝氏90度，為時90秒。把生蠔蘸以辣醬、檸檬汁、醋，或配以酒精，都不能殺死蠔隻中的有害微生物。下圖是一些烹煮蠔隻的貼士(圖3)：

### 選擇生吃則應減低風險

儘管部分人明白當中的風險，但仍然選擇進食生蠔。在這種情況下，要採取某些措施，把微生物風險減低。

無論出外或在家中用膳，消費者均應光顧持有相關批准/許可證的食物業處所，只食用以供生食的蠔。親身購買活蠔時，選擇鮮活完整的蠔，外殼應閉合或當輕敲時會閉上。如訂購外送生蠔，在送抵時檢查其整體狀況，例如度、食物容器是否完好及衛生狀況。去殼前，棄掉死了的蠔及表面黏滑、濕淋或色澤暗啞的蠔。

細菌如副溶血性弧菌可以在危險度範圍內迅速生長，要遠離危險度範圍，蠔隻必須一直保持低溫，直至進食為止。蠔隻應放在可食用冰粒上以保持低溫，並在去殼後立即食用。

為防止在貯存和處理蠔隻期間造成食物交

The Centre for Food Safety (CFS) investigated four food poisoning cases associated with the consumption of raw oysters in November 2022, with two cases involving a total of six people who dined at a restaurant, one case involving 10 people at another restaurant, and one case involving 23 people who attended a banquet. The affected persons had gastrointestinal symptoms such as abdominal pain, diarrhoea, nausea, and vomiting.

The CFS all along has been educating the public on the risks of eating raw oysters. However, raw oysters have gained increasing popularity among local people as reflected from our [Food Consumption Survey](#). Meanwhile, there has recently been an increase in the number of local food poisoning cases related to raw oysters - over 100 cases in 2021, compared to an average of around 25 cases per year between 2016 and 2020. Consumers should be aware of the inherent food safety risks of raw oysters as raw oysters have not been heat-treated to kill harmful microorganisms.

### Microbiological Risks of Oysters

Oysters are filter-feeders and concentrate microorganisms in sea-water. They are prone to be contaminated by harmful microorganisms such as *Vibrio* bacteria, norovirus and hepatitis A virus. Further, people can contract microorganisms with antimicrobial resistance ('superbugs') through eating raw or undercooked oysters. Whether or not 'superbugs' can cause illnesses, they may transfer their antimicrobial resistance genes to other bacteria inside the human body, therefore affecting the effectiveness of future use of antibiotics when needed.

To date, no technology exists that ensures that raw oysters are completely free of microbiological hazards. Imported raw oysters harvested in areas monitored for faecal contamination were occasionally found to be positive for norovirus by overseas authorities or linked to food poisoning outbreaks local and abroad. Although the majority of the affected persons have self-limiting diseases, consuming raw oysters can lead to serious health consequences, especially in vulnerable people like pregnant women, young children, the elderly, and people with weakened immunity.

To minimise the risk of food poisoning, it is best to cook oysters thoroughly reaching an internal temperature of 90°C for 90 seconds. Treating raw oysters with hot sauce, lemon juice, vinegar or alcohol does not kill the harmful microorganisms. The following figure are some tips on cooking oysters (Figure 3):

### Reduce the Risks If Choosing to Eat Raw

Even though some people are aware that eating raw oysters can be risky, they still prefer to do so. In this case, these are certain measures that must be observed to reduce the microbiological risk.

Whether they eat out or at home, consumers should patronise reliable food premises with relevant endorsement or permits. Only eat those oysters that are meant for consuming raw. When purchasing live oysters in person, choose fresh and intact oysters. The shell should be shut or should close when tapped lightly. When ordering delivery, check the general condition of the oysters upon receipt, such as the temperature, the integrity of the container and the hygiene conditions. Before shucking, discard dead oysters and those with slimy surface, in dripping state or of dull colour.

To stay away from Temperature Danger Zone in which bacteria like *Vibrio parahaemolyticus* can grow and thrive rapidly, it is essential to keep the oysters cool at 4°C or below all the way before consumption. Oysters should be put on edible ice cubes to keep them cool, and eat them as soon as taken off from the shells.

Food handlers should also prevent cross-contamination of foods during

	煮 Boiling	蒸 Steaming	炸 Frying	焗 Baking
方法 Method				
時間 Time	3-5 分鐘 mins	4-9 分鐘 mins	>3 分鐘 mins	>10 分鐘 mins
烹煮溫度 Cooking temperature	約攝氏100度 ~100°C	約攝氏100度 ~100°C	約攝氏190度 ~190°C	約攝氏230度 ~230°C

圖3: 徹底烹煮蠔隻的貼士  
Figure 3: Tips for cooking oysters thoroughly

叉污染，食物處理人員也應用有蓋的器皿盛載蠔隻並存放在雪櫃內。要時刻保持良好衛生，包括在處理蠔隻時清洗雙手、使用清潔的器具及在處理蠔隻時沖洗和洗刷外殼。開殼時，使用清潔的保護手套及經消毒的去殼刀，防止受傷和感染。即便如此，這些措施也不是萬全的，若蠔沒有經過徹底煮熟，進食生蠔所引致的感染風險便無法消除。

為加強食物安全，讓消費者(特別是高危人士)作出知情的選擇，食安中心發出新的食物安全建議，向市民提供關於生蠔的食物安全風險資訊，並發出業界指引，以便食物業界在供應供生吃的蠔時採取適當及可行的食物安全措施。食安中心呼籲市民和業界，在進食或供應生蠔時採取必要的預防措施。

storage and handling of oysters by keeping oysters in a covered container in the refrigerator. Practise good hygiene at all times, including washing hands, using clean utensils, and washing and scrubbing the shells when handling the oysters. Always use clean, protective gloves and sterilised oyster shucking knives when shucking oysters to prevent injury and infection. Still, these measure are not fail-safe; without thorough cooking, the risk of infection from eating raw oysters cannot be eliminated.

To enhance food safety and allow consumers especially the susceptible individuals to make informed choices, the CFS has issued new [food safety advice](#) that provides the public with information on the food safety risks of raw oysters as well as a set of [trade guidelines](#) to assist the food businesses implementing appropriate and practical food safety measures when serving oysters to be eaten raw. Both the public and food businesses are urged to take the necessary precautions when eating or serving raw oysters.

## 醃製生蟹的風險 Risks of Marinated Raw Crabs

最近，有人在網上分享了自行醃製生蟹的照片，引發有關食物是否安全的激烈討論。

[生或未煮熟的水產](#)或含有致病細菌及病毒，因此屬於高風險食物。生蟹及其他淡水甲殼類動物已知有包括衛氏並殖吸蟲在內，常見於亞洲、非洲和美洲的肺吸蟲寄生。生或未煮熟的小龍蝦或蟹即使經過醃製或鹽漬，人類進食後也可能會受到感染。肺吸蟲幼蟲可在人類進食後鑽進腸道，繼而進入肺部以及身體其他部分，症狀包括咳嗽、胸痛和咳血。部分野外捕獲的水產也可能帶有[肝吸蟲](#)、[蛔蟲](#)和[絛蟲](#)等寄生蟲。

進食生或未煮熟的水產所存有的風險本高於熟食。市民特別是[高危人士](#)應進食已徹底煮熟的食物。

Photos of self-prepared marinated raw crabs were recently shared on-line, sparking heated debate about their safety.

[Raw or undercooked aquatic products](#) are high risk food because they may contain bacteria and viruses that cause diseases. Raw crabs are also known for carrying parasitic lung flukes, including *Paragonimus westermani*, which are common in Asia, Africa and the Americas. Human can get infected after consuming affected raw or undercooked crayfish or freshwater crabs, even if they are marinated or salted. The lung fluke larvae can penetrate the intestine after ingestion, migrating to the lungs and also other parts of the body. Symptoms include coughing, chest pain and coughing up blood. Some wild-caught aquatic products may also harbour parasites like [liver flukes](#), [roundworms](#) and [tapeworms](#).

Aquatic foods that are raw or undercooked are inherently more dangerous to consume than cooked foods. People, particularly [susceptible populations](#), should consume thoroughly cooked foods.

## 享受燒烤樂趣，吃得安全又健康 Enjoying Barbecue Safely and Healthily

燒烤場重新開放後，參與燒烤活動現在更為方便。在起爐生火前，須注意一些要點，方能安全烹製食物。當食物加熱至超過攝氏200度時，隨着油脂分解，多環芳香族碳氫化合物等有害化學物便有可能形成。此外，要時刻提高警覺，以免食物未煮熟或熟食受生的食物交叉污染，導致食物中毒。

為減少燒烤食物時產生的有害化學物，應避免食物表面接觸火焰；同樣地，也要避免脂肪滴在熱源上。避免過度烹煮食物的同時，食物必須[徹底煮熟](#)，以殺滅由食物傳播的病原體。不要進食燒焦食物，燒焦部分則應切除。使用不同用具分開處理生熟食物，並保持手部衛生，以防止交叉污染。多進食蔬果，維持健康的飲食。

The reopening of barbecue pits makes barbecuing more accessible now. Before firing up the grill, there are a few points to note for prepping food safely. Hazardous chemicals, such as polycyclic aromatic hydrogens, could be formed when food is heated above 200°C while fat decomposes. In addition, we should stay vigilant on the pathogens in undercooked food and the cross-contamination of cooked food by raw food could cause food poisoning.

To reduce the formation of hazardous chemicals when cooking food at a barbecue, avoid direct contact of food with the flame, likewise fats from dripping into the heat source. While not overcooked and charring, the food should be [cooked thoroughly](#) to kill foodborne pathogens. Charred food should not be consumed and the charred parts should be removed. To prevent cross-contamination, use different utensils to handle raw and cooked food separately and maintain hand hygiene. For the sake of a healthy diet, it is essential to eat plenty of fruits and vegetables.



### 風險傳達工作一覽 (二零二二年十一月)

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