食物安全焦點
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麻痺性貝類毒素：當今認知與新近發展
Paralytic Shellfish Poisoning: Current Understanding and Recent Developments

食物安全中心風險傳達組
科學主任游天頌先生報告

Reported by Arthur YAU, Scientific Officer,
Risk Communication Section, Centre for Food Safety

海洋出產的海鮮種類繁多，包括蜆、青口、扇貝和蠔等雙殼貝類，蛾螺、海螺等腹足類動物，以及蟹和龍蝦等甲殼類動物。然而，海洋生態系統中可能存在天然毒素，當這些毒素在海鮮中積聚至相當分量時，便可能危害公眾健康。其中，麻痺性貝類毒素是引致進食海鮮後藻類毒素中毒的較常見成因之一。

The ocean offers a bounty of seafood, from bivalves like clams, mussels, scallops and oysters, to gastropods like whelks and sea snails, to crustaceans like crabs and lobsters. However, marine ecosystems can harbour natural toxins that may pose a threat to public health when significant amounts accumulate in seafood. Among them, Paralytic Shellfish Poisoning (PSP) toxins stand out as one of the more common forms of algal toxin poisoning from seafood.

甚麼是麻痺性貝類中毒？涉及哪些毒素？

麻痺性貝類中毒是一種食源性疾病，由進食受麻痺性貝類毒素污染的海鮮所引致。麻痺性貝類毒素是一組與石房蛤毒素相關、毒性強烈的天然海洋藻類毒素。石房蛤毒素可阻斷鈉離子通道，干擾哺乳類動物正常的神經訊號傳遞，攝入過量可引致死亡。這些毒素無臭、無味、無色，而且耐熱，不能透過烚、蒸、烤或冷凍等一般烹煮方法消滅。

What Is PSP and What Are the Toxins?

Paralytic Shellfish Poisoning is a foodborne illness caused by consuming seafood contaminated with PSP toxins, a group of potent natural marine algal toxins related to saxitoxins. Saxitoxins function as sodium channel blockers that disrupt normal nerve signal transmission in mammals, which can be lethal at sufficient quantity. These toxins are odourless, tasteless, colourless and heat-stable, and cannot be destroyed with standard cooking techniques such as boiling, steaming, grilling or freezing.

中毒症狀

麻痺性貝類毒素會影響神經系統，症狀可迅速出現，通常在進食受污染海鮮後半小時、甚至數分鐘內發作。症狀包括嘴唇、舌頭和口腔周圍出現刺痛、灼熱或麻痺感，麻痺感可蔓延至手指、腳趾等四肢末端。其他症狀包括噁心、暈眩、嘔吐、頭痛、刺痛、乏力、手腳協調能力下降和飄浮感。病情嚴重者可出現肌肉癱瘓、嚴重呼吸困難和呼吸衰竭，如未獲即時急救，更可能死亡。

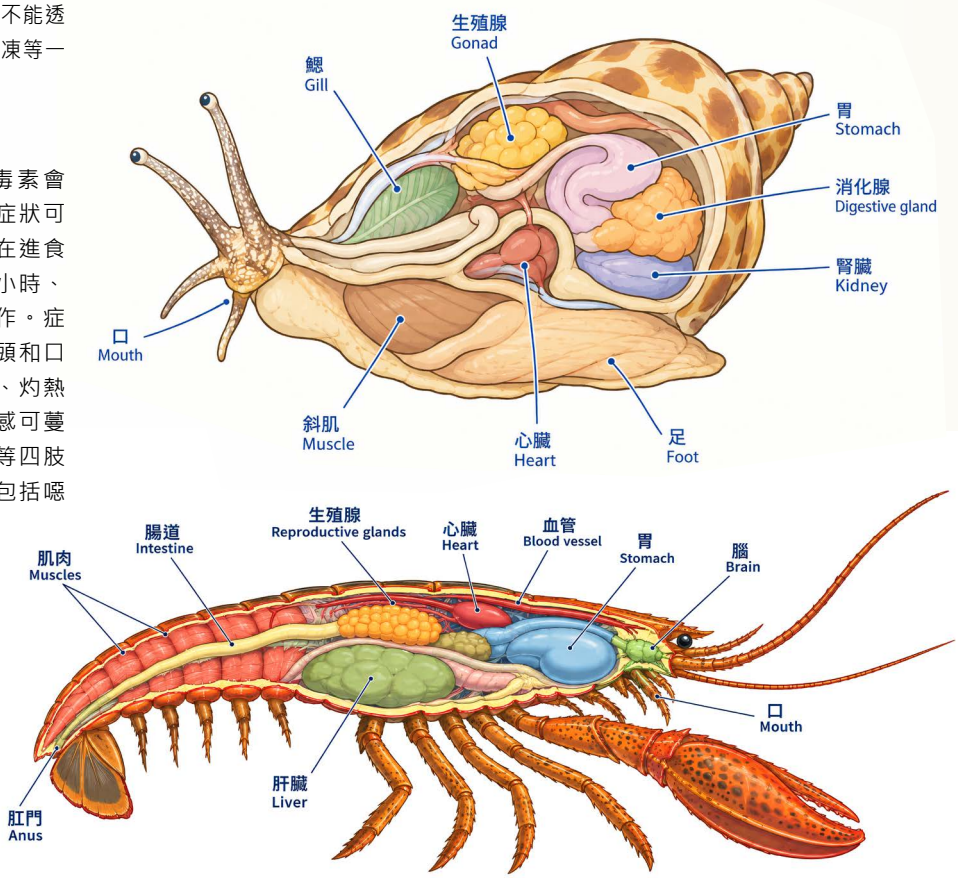


圖1：有報告指出，麻痺性貝類毒素主要積聚於某些腹足類動物（例如蛾螺和海螺）的消化腺，以及甲殼類動物（例如蟹和龍蝦）的肝（肝胰臟）（圖示僅供參考）
Illustration 1: PSP toxins have been reported to be concentrated in the digestive gland of some gastropods (e.g. whelks and sea snails) and the liver (hepatopancreas) of crustaceans (e.g. crabs and lobsters) (For illustrative purpose only).

藻類中的麻痺性貝類毒素如何進入海鮮？

麻痺性貝類毒素源自海洋中的微藻類（浮游藻類）。在特定環境條件下，例如水溫較高和營養充足時，藻類可迅速繁殖，形成大規模藻華，通常稱為「紅潮」。雙殼貝類屬濾食性動物，會過濾大量海水以獲取食物，因此在藻華出現期間，可能從微藻類攝入並積聚大量麻痺性貝類毒素。近年，世界各地亦曾在腹足類動物（例如蛾螺和玉螺）和甲殼類動物（例如蟹、龍蝦、小龍蝦和蝦）中驗出麻痺性貝類毒素。這些腹足類和甲殼類動物可因捕食受污染的雙殼貝類而積聚毒素。有報告指出，毒素可集中於某些雙殼貝類和腹足類動物的消化腺，以及蟹和龍蝦的肝（肝胰臟）。

不同海洋生物的覓食習性及處理毒素的方式各異，因此風險亦因物種而有所不同。雖然某些雙殼貝類可透過淨化過程排出毒素，但排出速度和成效不一。例如青口可在數星期內排出毒素，而某些蜆和扇貝的器官蓄積毒素的時間較長，高毒性水平可維持數月甚至數年之久。因此，在捕撈後採用淨化技術去除麻痺性貝類毒素，在商業運作上並不可行。

氣候變化會影響麻痺性貝類毒素嗎？

隨着海水溫度上升，一些研究指出，近數十年受藻類毒素（包括麻痺性貝類毒素）影響的海域逐漸擴大，令以往未受影響的水域也可能驗出麻痺性貝類毒素。

防控措施

由於捕撈後的加工處理不能有效去除麻痺性貝類毒素，預防中毒須從源頭着手，定期監測捕撈水域中有毒藻類的水平，以及所捕撈貝類中的毒素含量。香港定期監測食物中的麻痺性貝類毒素。由2023年至2026年8月，共有951個樣本接受麻痺性貝類毒素檢測，當中包括蛾螺及蛾螺製品樣本，所有檢測結果均令人滿意。

消費者應只向可靠的供應商購買雙殼貝類和甲殼類海產。為進一步減低貝類中毒的風險，應盡可能在食用前去除並棄掉貝類的所有內臟。任何人在進食貝類後感到不適，應立即求醫，並保留剩餘食物，以供調查和化驗。

As PSP toxins affect the nervous system, symptoms can develop rapidly, often within half an hour or even minutes after the consumption of contaminated seafood. The symptoms range from tingling, burning or numbness around the lips, tongue and mouth, to spreading numbness of extremities like fingers and toes. Other symptoms include nausea, dizziness, vomiting, headache, tingling sensations, weakness, loss of coordination and a feeling of floating. PSP can also lead to muscle paralysis, severe shortness of breath, respiratory failure and death in severe cases if the patient does not receive immediate emergency medical support.

How Do PSP Toxins from Algae End Up in Seafood?

The journey of PSP toxins begins with microscopic marine algae (phytoplankton) in the ocean. Under specific environmental conditions, such as warm water temperatures and abundant nutrients, algae can multiply rapidly, creating massive blooms often referred to as "red tides". Bivalves, as filter feeders, filter large volume of seawater to obtain food and thus can accumulate significant amount of PSP toxins from microscopic algae during algal blooms. In more recent times, PSP toxins have also been detected in gastropods (e.g. whelks and moon snails) and crustaceans (e.g. crabs, lobsters, crayfish and shrimps) in various locations around the world. These gastropods and crustaceans can accumulate PSP toxins by preying on and consuming affected bivalves. The toxins are reported to be concentrated in the digestive glands of some bivalves and gastropods, and in the liver (hepatopancreas) of crabs and lobsters.

As different marine organisms have different feeding habits and process toxins differently, the risk level varies depending on the species. Although some bivalves can eliminate toxins at different rates through the depuration process, the effectiveness varies. For example, mussels clear toxins within weeks, while certain clams and scallops can retain high toxicity levels in their organs for longer periods, spanning months or even years. Depuration is therefore unlikely to be adopted commercially for post-harvest removal of PSP toxins.

Are PSP Toxins Affected by Climate Change?

With the increase in sea water temperature, some studies have noted a gradual expansion of areas that are affected by algal toxins, including PSP toxins, in recent decades. This can lead to the detection of PSP toxins in previously unaffected waters.

Control Measures

Preventing PSP relies on regular monitoring at the source for the levels of toxic algae in harvesting areas and in the shellfish harvested, as post-harvest processing is not effective in removing PSP toxins. In Hong Kong, analysis for PSP toxins in food is conducted regularly. From 2023 to August 2026, 951 samples (including samples of whelk and whelk products) had been analysed for PSP toxins. All results were satisfactory.

For consumers, purchase bivalves and crustaceans only from reliable sources. To further reduce the risk of shellfish poisoning, remove and discard all internal organs of shellfish where possible before consumption. Anyone who falls sick after eating shellfish should immediately seek medical attention and save any leftovers for investigation and laboratory testing.

校園食安心：如何守護校園午膳安全

"Lunch Break, No Outbreak": How to Keep School Lunch Safe?

食物安全中心風險傳達組研究主任趙梓進先生報告

Reported by Patrick CHIU, Research Officer, Risk Communication Section, Centre for Food Safety

新學年已經開始，學校和幼兒機構或會為學生提供由外間膳食供應商供應或在校內廚房製作的午膳。處理食物不當可能帶來重大的食物安全風險，對較容易患上食源性疾病的幼童尤甚。學校和幼兒機構與家長教師會攜手合作，對保障校園食物安全發揮重要作用。本文介紹選擇飯盒供應商時須考慮的要點，以及校園內其他須注意的食物安全事項。

選擇膳食供應商

為保障學生健康，學校和幼兒機構需審慎選擇膳食供應商。所選供應商必須持有食物環境衞生署（食環署）簽發的有效「食物製造廠牌照（獲准供應午餐飯盒）」。與供應商訂立的合約可列明食物選擇、製作標準、食物製作和運送過程中的時間和溫度控制要求，以及午膳的貯存和分發方式。學校和幼兒機構可考慮選用

With the new school term underway, schools and childcare facilities may provide their students with lunch meals, either from external meal suppliers or prepared by school kitchens. Improper food handling may pose significant food safety risks, particularly for young children, who are more susceptible to foodborne illness. Schools and childcare facilities, together with the Parent-Teacher Associations (PTA), play an essential role in collectively safeguarding food safety in schools. This article discusses key considerations when selecting meal suppliers and provides other food safety tips to observe on campus.

Selection of Meal Supplier

To safeguard the health of students, schools and childcare facilities can exercise careful consideration when selecting meal suppliers. Selected suppliers must hold a "Food Factory (Approved to Supply Lunch Boxes) licence" issued by the Food and Environmental Hygiene Department (FEHD). The contract with the supplier can set out the food choices, preparation standards, temperature and time controls during processing and delivery, as well as storage and distribution methods for the lunch meals. Schools and childcare facilities may wish to consider suppliers that have established a food safety management system with certifications (e.g. Hazard Analysis Critical Control Point (HACCP) or ISO 22000) and conduct a duty visit to the supplier's food premises between school terms to ensure that proper hygiene conditions are maintained.



圖2：學校和幼兒機構常見的午膳模式：飯盒、在校內即場分份或以自助餐形式供應食物
Figure 2: Common modes of organising school lunches by schools and childcare facilities, namely lunch boxes, portioning food on-site and buffet meals

已設立並取得食物安全管理系統認證的供應商，例如取得「食物安全重點控制」（HACCP）或 ISO 22000 認證的供應商。此外，可於學期之間到供應商處所實地視察，查看供應商有否遵從適當的衞生規範。

校園食物安全貼士

烹煮和翻熱

要消滅食源性致病菌，適當烹煮和翻熱食物是重要而有效的方法。如學校午膳在校內廚房烹煮或翻熱，應確保食物徹底煮熟或翻熱，其中心溫度達攝氏75度或以上，並維持至少30秒。為避免過早配製食物，建議校內廚房預先規劃烹煮或翻熱程序。

安全溫度

貯存溫度不當可令細菌（尤其是蠟樣芽孢桿菌和產氣莢膜梭狀芽孢桿菌）在已煮熟的食物中迅速繁殖。如午膳由供應商在其廚房預先製作後運送到校，建議學校與供應商及運送服務提供者保持良好溝通，盡量縮短食物處於危險溫度範圍（攝氏4度至60度）的時間。

無論學校以何種方式提供午膳，熟食均應利用適當的保溫或冷存設備，保持在安全溫度，即熱食保持在攝氏60度以上，冷食則保持在攝氏4度或以下。謹記遵守「兩小時／四小時原則」，以控制細菌繁殖的風險。

分發午膳

飯盒送抵學校後，需盡快分發給學生。如午膳在校內即場分份或以自助餐形式供應，需提供足夠而清潔的空間、合適的設備（例如電熱保溫設備），並安排足夠人手，以便迅速分發食物。負責分發食物的人員需保持良好的個人衞生，以防交叉污染。如在分發午膳期間發現任何異常情況，例如保溫溫度不足或食物受到物理性污染，學校應通知飯盒供應商，並立即採取糾正措施。

餐單設計

學校和幼兒機構需定期與供應商溝通，確保餐單為學生提供均衡而多元化的膳食，包括鈉和糖含量較低的食物選擇。由於幼童較容易患上食源性疾病，餐單不應包括高風險食物，例如太陽蛋、壽司和刺身。應選用較安全的替代食物，以減低學生患上食源性疾病的風險。

哽喉風險

幼童進食時可能有哽喉的風險，尤其是當他們沒有充分咀嚼食物或試圖整口吞下食物時。因此，學校和幼兒機構需格外注意可能引致哽喉的食物。教師和照顧者應協助幼童養成良好的進食習慣，以減低校園內發生哽喉事故的風險。

為提高學校對食物安全和衞生的意識，食物安全中心與食環署環境衞生部已加強巡查全港供應學校飯盒的持牌食物製造廠。此外，中心亦推出了「校園食安心」專題網站，協助學校和幼兒機構統籌食物安全各方面的工作，為學生和幼童締造安全、健康的飲食環境。

Food Safety Tips to Observe on Campus

Cooking and Reheating

Both cooking and reheating are essential and effective procedures to eliminate pathogens in food. If school lunches are cooked or reheated in school kitchens, food should be thoroughly cooked or reheated, with its core temperature reaching at least 75°C for at least 30 seconds. To avoid food preparation too far in advance, school kitchens are advised to plan ahead for the cooking or reheating processes.

Safe Temperature

Improper storage temperature can lead to the rapid growth of bacteria, particularly *Bacillus cereus* and *Clostridium perfringens*, in cooked meals. If lunch meals are prepared in suppliers' kitchens in advance for delivery, schools are advised to maintain good communication with the suppliers and delivery service providers to minimise the time that food is exposed to the temperature danger zone (between 4°C and 60°C).

Regardless of the mode of organising school lunches, cooked food should always be stored at a safe temperature (e.g. hot food at above 60°C; cold food at 4°C or below) using either hot-holding or cold-holding equipment and following the 2-hour / 4-hour rule to prevent bacterial growth in food.

Distribution

Upon arrival at schools, lunch boxes should be distributed to students as soon as possible. If lunch meals are portioned on site at schools or served in a buffet-style arrangement, a clean and adequate space, appropriate equipment (e.g. electric warming devices), and sufficient manpower are needed to facilitate efficient distribution. Staff responsible for food distribution can help prevent cross-contamination by practising good personal hygiene. If any irregularities (e.g. insufficient hot-holding temperatures or physical contamination) are observed during the distribution of lunch meals, schools should notify the meal suppliers and take immediate rectifying measures.

Menu Planning

Schools and childcare facilities can regularly liaise with suppliers to ensure that the menus offer a balanced and varied diet for students, particularly by providing food choices that are lower in sodium and sugar. As young children are more susceptible to foodborne illness, high-risk foods (e.g. sunny-side-up eggs, sushi and sashimi) should be avoided on the menu, and safer alternatives can be chosen for students to minimise the risk of foodborne disease.

Choking Hazards

For young children, there may be a risk of choking while eating, especially when they do not chew food thoroughly or try to swallow it whole. As such, schools and childcare facilities should take extra caution to specific foods. Teachers and caregivers are advised to reinforce good eating habits among young children, so as to reduce choking risks at school.

To enhance food safety and hygiene awareness among schools, the CFS and the Environmental Hygiene Branch of the FEHD have stepped up inspections of licensed food factories supplying school lunch boxes in various districts of Hong Kong. In addition, the CFS has launched a thematic website "Safe Food at School" to help schools and childcare facilities coordinate all aspects of food safety in order to build a safe and healthy eating environment for students and young children.

提防野芋　正確烹煮可食用芋頭以降低風險

Beware of Wild Taro and Cook Edible Taro Properly to Reduce Risk

因誤採或誤售野生芋頭而引致的食物中毒個案時有發生。野芋含有大量針狀草酸鈣晶體。這些晶體會刺入黏膜，導致口腔灼熱和腫脹。一般的浸泡或烹煮並不能有效消除如此大量的晶體。因此，市民切勿採集外形類似芋頭的植物食用。

至於可食用的芋頭，食用其葉和葉柄在香港並不普遍，但在其他地區卻甚受歡迎。可食用芋頭的晶體含量雖然遠低於野芋，但其葉和葉柄仍可能引起刺激。文獻顯示，去皮、切塊、浸泡、鹽醃、發酵、沸水焯煮後棄掉煮食用水，以及徹底煮熟等傳統處理方法，均有助減少刺激。這些步驟能洗去草酸鹽並鈍化晶體，但由於野芋晶體含量極高，這些方法對其並不奏效。

為預防食物中毒，市民切勿採集野生植物食用，並應只向可靠的供應商購買食材。業界亦必須確保售賣的植物屬可食用品種。切勿以野芋葉包裹農產品。

Food poisoning cases occasionally occur when wild taro is mistakenly picked or sold. Wild taro contains high concentrations of needle-like calcium oxalate crystals, which can penetrate mucous membranes, causing burning and swelling of the mouth. Because normal soaking or cooking cannot effectively reduce this high crystal load, one should never pick and consume any taro-like plants.

As for the edible taro plant, while consuming its leaves and stalks is less common in Hong Kong, they are popular in other regions. Although edible taro contains far lower levels of crystals, its leaves and stalks still pose an irritation risk. Literature shows that traditional preparation methods, such as peeling, cutting, soaking, salting, fermenting, boiling and discarding the water, and cooking thoroughly, help reduce such irritation. These steps wash out oxalates and blunt the crystals, but they do not work on wild taro because its crystal load is simply too high.

To prevent poisoning, never pick wild plants and buy food only from reliable suppliers. Vendors must ensure they sell only edible species and never wrap produce in wild taro leaves.

從小培養良好食安習慣：食物安全中心兒童故事書

Learning Food Safety Habits Starts Young: CFS Storybook for Children

俗語有云：「良好習慣，從小培養。」食物安全亦不例外。兒童正處於易受薰陶的成長階段，若能及早培養良好的食物安全習慣，有助他們在長大成人後繼續持之以恆。

有見及此，食物安全中心最近出版了一本兒童故事書，向小學生介紹基本的食物安全概念。這本中文故事書以校園為背景，由中心吉祥物食安仔和食安妹妹擔任老師，透過課堂和校園活動，向學生（包括手套仔、燒賣妹妹、生肉、包包和一把刀）傳授食物安全知識，例如認識交叉污染、使用不同用具處理生的食物和即食食物、在配製食物和冷藏貯存時把兩者分開，以及正確洗手、使用手套和保持食物配製區清潔的方法。

這本兒童故事書以全彩色漫畫形式呈現，可於中心的「校園食安心」專題網頁下載。不妨與孩子一起閱讀，讓他們從小建立良好的食物安全習慣。



There is a saying “good habits start young”. This also applies to food safety, where forming good food safety habits when children are still impressionable goes a long way towards establishing good food safety habits as adults.

With this in mind, the Centre for Food Safety (CFS) has recently published a children’s book to promote basic food safety concepts to primary school students. The Chinese storybook is set in a school where the CFS mascots (On and Mui) teach their class food safety basics through lessons and school activities. Their students, Glove Boy, Siu Mai, Raw Meat, Loaf and Chopper, learn about cross-contamination, using separate utensils for handling raw and ready-to-eat (RTE) food, separation of raw and RTE food during preparation and refrigerated storage, proper hand washing and glove usage and how to keep the food preparation area clean.

The full-colour children’s book, fully illustrated in comic format, can be downloaded from the CFS thematic webpage “Safe Food at School”. Share it with children and build food safety habits from an early age.



風險傳達工作一覽（二零二六年九月）

Summary of Risk Communication Work (Sep 2026)

事故/ 食物安全個案 Incidents/ Food Safety Cases: 556	公眾查詢 Public Enquiries: 140	業界查詢 Trade Enquiries: 196	食物投訴 Food Complaints: 874
給業界的快速警報 Rapid Alerts to Trade: 2	給消費者的食物警報 Food Alerts to Consumers: 1	教育研討會/ 演講/ 講座/ 輔導 Educational Seminars/ Lectures/ Talks/ Counselling: 37	上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website: 60