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焦點個案

Incident in Focus

即食食物受交叉污染

Cross-contamination of Ready-to-eat Food

食物安全中心風險傳達組
科學主任莊梓傑博士報告

Reported by Dr. Ken CHONG, Scientific Officer,
Risk Communication Section, Centre for Food Safety

背景

二零一九年十月，分別發生兩宗懷疑因副溶血性弧菌造成的食物中毒個案，其後其中一宗個案中兩名患者的糞便樣本檢出該菌。在這兩宗個案中，懷疑涉事的食品有滷味、熟雞及雞飯。由於副溶血性弧菌通常存在於海產中，故交叉污染可能是這些個案的成因。

Background

In October 2019, there were two separate food poisoning outbreaks suspected to be caused by *Vibrio parahaemolyticus*. Stool specimens of two affected persons in one of the outbreaks were later tested positive for the bacterium. The suspected incriminated food items in the outbreaks were lo-mei, cooked chicken and chicken rice. Since *Vibrio parahaemolyticus* usually occurs in seafood, cross-contamination likely contributed to the outbreaks.

交叉污染 時有發生

交叉污染是食物中毒個案的常見成因，在二零一七年及二零一八年所發生有關本地食肆及食物業的食物中毒個案中，交叉污染是最常見的兩大成因之一。在實地調查上述於十月發生的個案時發現，涉事食肆處理食物的方式不當，帶來交叉污染的風險。

舉例來說，把未經烹煮的海產置於處理即食食物的地方，把未有蓋好的生介貝類與可供即時食用的雞一同存放於雪櫃的同一貯存格內，以及食物處理人員雙手衛生欠佳，都可能是交叉污染的途徑。

不同的傳播途徑

交叉污染是指細菌由一種食物(通常是生的)傳播至另一種食物。受污染的即食食物具有較高的風險，因為食用前不會再經進一步的烹煮程序殺滅細菌。

一般來說，在兩種情況下可能會出現交叉污染：第一種情況是食物與食物接觸，或有汁液滴下至另一種食物上，直接傳播細菌。舉例來說，如果生的介貝類的汁液滴下至雪櫃內的蛋糕上，細菌便會由介貝類傳

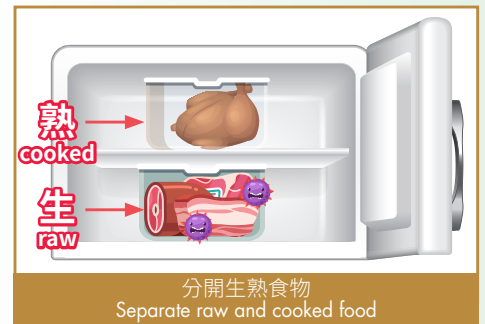


圖1: 防止交叉污染的重點方法

Figure 1. Highlight of ways to prevent cross-contamination.

Cross-contamination is not Uncommon

Cross contamination is a common contributing factors for food poisoning outbreaks and is amongst the top two most common identified contributing factors for food poisoning outbreaks related to local food premises and food business in 2017 and 2018 respectively. Regarding the two outbreaks in October mentioned earlier, improper food-handling practices risking cross-contamination were identified upon investigation at the food premises. For example, placing uncooked seafood at food-handling area for handling ready-to-eat food, storing uncovered raw shellfish together with ready-to-eat chicken in the same compartment of the fridge, and unsatisfactory hand hygiene practice of food handlers are all possible routes of cross-contamination.

Different Ways of Spreading

Cross-contamination refers to the transfer of bacteria from

焦點個案

Incident in Focus

播至蛋糕。第二種情況是經由受污染的手、設備、廚具、工作面，甚或水花，間接把細菌傳播至食物。如果食物處理者在處理生的食物後未有徹底洗淨雙手，細菌便會由受污染的手被帶到所接觸的任何東西，包括即食食物。同樣地，如果使用同一設備或廚具來處理生的食物及熟食/即食食物，但每次使用前沒有妥為清潔，也會出現交叉污染。舉例來說，如果在砧板上切生雞，細菌便可由生雞傳播至砧板，甚或深入砧板上的花痕或切口。如果同一砧板在使用前未有徹底清潔，細菌便很可能會傳播至隨後在砧板上處理的熟食/即食食物。

沖洗生的肉類及家禽有時也會導致交叉污染，因為飛濺的水花可把其中的細菌由洗滌盆帶至80厘米以外，污染附近的表面、器具或食物。如果需要沖洗生的肉類及家禽，必須徹底清洗洗滌盆及四周的範圍，以防交叉污染。

黃金規則—食物安全五要點

「食物安全五要點」是五個簡單而有效的步驟，有助處理食物時預防食源性疾病。以下是給所有食物處理者的一些實用貼士：

- 在配製食物時，食物處理者應經常洗手，尤其是在接觸生的食物後，以及在處理熟食/即食食物前。
- 避免把生的食物與熟食/即食食物貯存於同一雪櫃內接近的位置，並應把生的食物置於熟食/即食食物下方，以防其汁液滴下至熟食/即食食物上。
- 每次使用器具及工作面後，尤其是在配製生的食物後，以熱水及清潔劑加以清洗。
- 使用不同的器具分開處理生的食物及熟食/即食食物。

注意事項

1. 交叉污染是食物中毒個案的常見成因。
2. 由生的食物引致的交叉污染，成因可以是直接由受污染的食物傳播細菌至其他食物，或間接經由受污染的手、設備、工作面、器具或水花把細菌傳播至其他食物。
3. 為防出現交叉污染，應嚴格遵從「食品安全五要點」的原則，尤其是要經常保持雙手衛生，並妥為分開生的食物及熟食/即食食物。

給市民的建議

- 把購物車或購物籃中的即食食物與生的食物分開，特別是生的肉類、家禽及海產。
- 把生的食物放在獨立的袋或容器中，以免其汁液(如有的話)滴下至其他食物上。

給業界的建議

- 不應把生的食物帶到處理熟食/即食食物的食物處理區。
- 洗手及乾手設施應設於食物配製或製造區的適當位置，以確保食物處理人員可隨時使用。如可能的話，應設有無須用手開關的水龍頭及單次使用的紙巾，以防雙手洗淨後再受污染。
- 最好設有兩個雪櫃，分開貯存生的食物及熟食/即食食物。

one food, often raw, to another. Contamination in ready-to-eat food is of higher risk as there is no further cooking process to kill the bacteria before consumption.

In general, there are two ways how cross-contamination may occur. Firstly, bacteria can be transferred directly when one food touches or drips onto another. For example, if raw shellfish drips onto a cake in the fridge, bacteria will spread from the shellfish to the cake. Secondly, bacteria can be transferred indirectly from contaminated hands, equipment, kitchen utensils, work surfaces or even splashes to food. If food handlers do not wash their hands thoroughly after handling raw food, bacteria will be carried to whatever things, including ready-to-eat food, touched by contaminated hands. Similarly, cross-contamination can also happen when the same equipment or kitchen utensils are used for both raw and cooked/ready-to-eat foods without proper cleaning between uses. For example, if you cut a raw chicken on a chopping board, bacteria can spread from the raw chicken to the board or even into deep gouges or cuts on the board. If the same board is used without thorough cleaning, the bacteria will likely spread to the next cooked/ready-to-eat food applied to the board.

Washing raw meat and poultry can sometimes result in cross-contamination too, when bacteria in splashes can spread up to 80 cm from the sink causing contamination to nearby surfaces, utensils or food. If washing raw meat and poultry is necessary, thorough cleaning of the sink and its surrounding areas is very important to prevent cross-contamination.

Gold Rules: 5 Keys to Food Safety

The “5 Keys to Food Safety” are five simple and effective steps for people to prevent foodborne diseases when handling food. Here are some practical tips for all food handlers:

- During food preparation, food handlers should always wash their hands, especially after touching raw food and right before handling cooked/ready-to-eat food.
- Storage of raw food and cooked/ready-to-eat food in close proximity inside the same fridge should be avoided. Raw food should be placed below cooked/ready-to-eat food in the fridge to prevent juices from dripping onto cooked/ready-to-eat food.
- Wash utensils and worktops with hot water and detergent after each use, especially after preparing raw food.
- Use separate utensils to handle raw food and cooked/ready-to-eat food.

Key Points to Note

1. Cross-contamination is a common contributing factor for food poisoning outbreaks.
2. Cross-contamination from raw food can occur directly from contaminated food to other food, or indirectly by contaminated hands, equipment, work surfaces, utensils or splashes to other food.
3. To prevent cross-contamination from happening, people should adhere strictly to the principles of the “5 Keys to Food Safety”, in particular always maintain good hand hygiene and separate raw food and cooked/ready-to-eat food well.

Advice to the Public

- Separate raw food, especially raw meat, poultry and seafood, from ready-to-eat food in your shopping trolley or basket.
- Place raw food in a separate bag or container to prevent its juice, if any, from dripping onto other foods.

Advice to the Trade

- Raw food should not be carried to the food-handling area for handling cooked/ready-to-eat food.
- Hand washing and drying facilities should be suitably located in food preparation or production areas to ensure they are readily accessible to food handlers. Where possible, non-hand operable taps and single-use towels should be equipped to help prevent re-contamination of clean hands.
- Ideally, install two refrigerators for storing raw food and cooked/ready-to-eat food separately.

食用油脂中的苯並[a]芘

Benzo[a]pyrene in Edible Fats and Oils

食物安全中心風險評估組
科學主任孫蓉莉博士報告

Reported by Dr. Lily SUEN, Scientific Officer,
Risk Assessment Section, Centre for Food Safety

我們在烹調時經常會使用油脂，例如炒、炸和烘焙，亦可配以沙律及麪包食用。油脂中可能存在一些食物安全危害，其中包括苯並[a]芘等污染物。讓我們在本文中探討甚麼是苯並[a]芘，以及如何降低食用油脂中苯並[a]芘的含量和減少從膳食中攝入這種污染物。

Fats and oils are frequently used in our culinary practices, for example, for stir-frying, deep-frying and baking, as well as for salad dressing and bread dips. A number of food safety hazards may be present in fats and oils, including one of the potential contaminants, benzo[a]pyrene (B[a]P). In this article, let's take a look at what B[a]P is, and how we can reduce its occurrence in edible fats and oils and our dietary exposure to B[a]P.

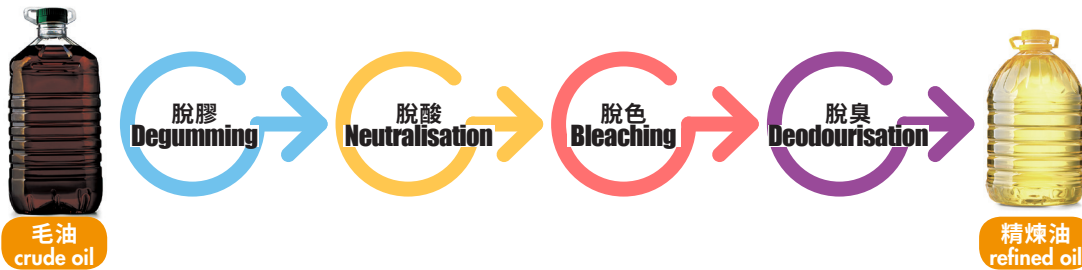


圖2: 食用油脂的精煉過程

Figure 2. The refining process of edible fats and oils.

What is B[a]P and its health effects in humans?

B[a]P is a kind of polycyclic aromatic hydrocarbons (PAHs), which are ubiquitous in the environment as contaminants, being present in air, soil, water and food. PAHs may be formed during incomplete combustion or

pyrolysis (i.e. chemical decomposition by heating in the absence of oxygen) of organic matters during industrial processes and food processing.

什麼是苯並[a]芘？對人類健康有何影響？

苯並[a]芘是一種多環芳香族碳氫化合物(polycyclic aromatic hydrocarbons, 簡稱PAHs)，在環境中無處不在的污染物，存在於空氣、土壤、水及食物中。在工業過程及食品加工過程中，有機物被不完全燃燒或熱解(即在無氧情況下以熱力進行化學分解)時可能會產生PAHs。

Of note, the formation of PAHs is only significant at higher temperatures, generally over 350-400°C; below this temperature the formation of B[a]P in food is minimal. Certain methods of food preparation, including drying (e.g. drying food through direct contact of combustion gases), roasting, smoking and barbecuing, are recognised as important sources of food contamination with B[a]P.

值得注意的是，PAHs通常在攝氏350至400度以上的高溫下，才會大量產生；此溫度以下，在食物中產生的PAHs甚少。某些食物配製方法，包括乾燥(例如透過直接接觸燃燒產生的氣體烘乾食物)、烘焗、煙燻和燒烤，都是食物受苯並[a]芘污染的主要途徑。

B[a]P is toxic to human genes and is classified as a Group 1 agent (i.e. carcinogenic to humans) by the International Agency for Research on Cancer (IARC) of the World Health Organization. Due to the genotoxic and carcinogenic nature of B[a]P, no safety reference value for B[a]P can be determined; efforts should be focused on minimising its exposure as far as practicable so as to reduce the health risks it associated.

苯並[a]芘對人類基因有害，世界衛生組織的國際癌症研究機構將之列為第一組(即「令人類患癌」)的物質。基於苯並[a]芘的基因毒性及致癌性，苯並[a]芘的安全參考值無法被釐定。為了減低相關的健康風險，市民應盡量減少攝入苯並[a]芘。

What are the sources of dietary exposure of B[a]P?

The Joint FAO/WHO Expert Committee on Food Additives (JECFA) has concluded that one of the major contributors to intakes of PAHs is vegetable fats and oils owing to their higher concentrations of PAHs. Even though smoked and barbecued foods usually contain higher concentrations of PAHs in general, they do not contribute significantly to the dietary intake of PAHs as they constitute small components of the diet.

攝入苯並[a]芘的膳食來源是什麼？

聯合國糧食及農業組織/世界衛生組織食物添加劑聯合專家委員會指出，植物油含有較高濃度的PAHs，因此是膳食中攝入PAHs的主要來源之一。雖然煙燻及燒烤食物一般也含有較高濃度的PAHs，但這些食物只佔膳食中的小部分，因此它們並非對PAHs的攝入量有顯著影響的食物。

Why are edible fats and oils contaminated with B[a]P?

B[a]P present in the environment may contaminate foods including cereals and plants used for the production of vegetable oils. In addition, vegetable oils can also be contaminated during smoking and drying processes, where combustion products may come into contact with the food, for drying oil seeds prior to oil extraction.

為何食用油脂會受苯並[a]芘污染？

存在於環境中的苯並[a]芘可能會污染食物，包括用於生產植物油的穀物及植物。此外，在煉油前熏製和乾燥原材料的過程中，油籽可能會接觸到燃燒時的產物，也可能使植物油受到苯並[a]芘污染。

What are the ways to reduce B[a]P in edible fats and oils?

Codex has established a "[Code of Practice for the Reduction of Contamination of Food with Polycyclic Aromatic Hydrocarbons \(PAH\) from Smoking and Direct Drying Processes](#)", which provides guidance to prevent and reduce contamination of foods with PAHs in commercial smoking and direct drying processes. Among other things, it highlights that direct contact of oil seeds or cereals with combustion products during drying processes can result in contamination with PAHs and should therefore be avoided; contact of food with combustion gases should also be minimised.

有何方法減少食用油脂中的苯並[a]芘？

食品法典委員會制定了《[降低熏製和直接乾燥工藝過程中多環芳香族碳氫化合物污染食品的操作規範](#)》，就預防並減少食物在商業熏製和直接乾燥的過程中受PAHs污染提供指引。當中特別提及，由於油籽或穀物在乾燥過程中與燃燒所產生的物質直接接觸時可造成PAHs污染，故應避免相關操作；此外，也應盡可能減少食物與燃燒氣體的接觸。

如使用烘爐進行乾燥過程，烘爐的溫度應足以讓燃料完全燃

Where a system with a burner is being used in the drying process, the temperature of the burner should be sufficient to allow complete combustion of the fuel, as incomplete combustion can lead to formation of PAHs in the drying

燒，因為不完全燃燒會導致PAHs在用以乾燥的氣體中產生。此外，乾燥的時間應盡量縮短，以盡可能減少加工食品接觸可能被PAHs污染的氣體的機會。

最後，同樣重要的是，油的苯並[a]芘含量可在精煉過程，包括脫色(例如添加活性炭)及脫臭步驟中降低，而苯並[a]芘最終的含量則取決於精煉的條件(見圖2)。

如何減少從膳食中攝入苯並[a]芘？

我們應保持均衡而多元化飲食，其中包括各種水果和蔬菜；切勿過量進食燒烤肉類，尤其是炭爐烤製的肉類及煙燻肉類/魚類；以及切除食物燒焦的部分。儘管油脂對人類吸收脂溶性維他命是不可或缺的，但根據健康飲食金字塔，我們應盡量少吃脂肪及油。在可行的情況下，常選擇較有益健康的油脂，即含豐富單元不飽和脂肪酸(例如芥花籽油及橄欖油)及多元不飽和脂肪酸(例如粟米油及大豆油)的油。

gases. Furthermore, the drying time should be as short as possible to decrease the exposure of the processed food to the potentially contaminating gases as much as possible.

Last but not least, the level of B[a]P in oils can be reduced during the refining processes, including the bleaching (e.g. addition of activated carbon) and deodourisation steps, while the final level of B[a]P depends on the refining conditions adopted (see Figure 2).

How can we reduce B[a]P exposure from our diet?

We should maintain a balanced and varied diet, which comprises a wide variety of fruits and vegetables; avoid overindulgence in barbecued meat, particularly charcoal grilled meat and smoked meat/fish; and remove charred parts of food. Although fats and oils are essential in the absorption of fat-soluble vitamins, we should eat fats and oils sparingly with reference to the food pyramid. Always choose healthier oils and fats, i.e. oils rich in monounsaturated fatty acids (e.g. canola oil and olive oil) and polyunsaturated fatty acids (e.g. corn oil and soybean oil), whenever possible.

食物事故點滴 Food Incident Highlight

慎防海產的鎘含量超標

Beware of Excessive Cadmium in Seafood

食物安全中心最近公布，三個麵包蟹樣本的鎘含量超出法例標準。涉事商戶已按指令停售受影響批次的產品。

世界衛生組織指出，鎘是引起重大公共衛生關注的金屬污染物。攝入過量鎘可使人慢性中毒，例如造成不能逆轉的腎功能障礙。海產是鎘的主要膳食來源。一些海產，例如麵包蟹、蠔及扇貝，含有較高分量的鎘，特別是其內臟。魚類的鎘含量則一般較低。

規管食物中金屬雜質含量的優化規例已於不久前生效，涵蓋範圍更廣。雖然有關規例已加強保障，但消費者仍不宜過量食用鎘含量高的海產。業界則應向可靠的供應商採購食物，並確保所有食物符合法例要求。

The Centre for Food Safety recently announced that the cadmium level of three brown crab samples exceeded the legal limit. The vendors involved were instructed to stop selling the affected batches of the products.

Cadmium is a metallic contaminant identified as of major public health concern by the World Health Organization. Excessive intake of cadmium can cause chronic toxicity in humans such as irreversible kidney dysfunction. Seafood is a major dietary source of cadmium. Some seafood, such as brown crabs, oysters and scallops, contains relatively high levels of cadmium, especially in their viscera. Fish, on the other hand, contains lower cadmium levels in general.

The enhanced regulation of metallic contamination which has a wider coverage came into force recently. With better protection by the regulation, consumers are still advised not to over-consume in seafood high in cadmium. The trade is advised to source food from reliable suppliers and to ensure that all foods comply with the legal requirements.

近期的社會事件與食物安全

Recent Social Events and Food Safety

鑑於近期的社會事件，有市民關注到食物可能受催淚煙或其他物質所污染。

為了減低污染的風險，食物須妥為貯存於適當地方，例如清潔及已蓋好的食物容器內。如身處於室內而附近有催淚煙發放，應關閉所有門窗和關上空調，並以濕布封上門窗罅隙，以減低室內受污染的機會。事發後應留意食物包裝是否完好，並檢查食物有否受到損壞或污染。如食物懷疑受污染或有異樣，為審慎起見，便不應進食。

在一般情況下，以流動水清洗一些食物，例如蔬果，可減少表面的污染物。然而，如食物懷疑受污染或有異樣，為審慎起見，便不應進食。

In view of the recent social events, there are public concerns that food may be contaminated by tear gas or other substances.

To reduce the risk of contamination, food should be properly stored in a suitable place such as a clean and covered food-grade container. In an indoor environment when tear gas is being released nearby, close all doors and windows, turn off the air conditioner, and seal the gaps over the doors and windows with wet towels to reduce the chance of contamination indoors. After any such incident, check whether the packaging of food is intact and whether any food is damaged or contaminated. For the sake of prudence, food suspected to be contaminated or showing abnormality should not be consumed.

In general, contaminants on the surface of some kinds of food, such as fruits and vegetables, can be reduced by washing with running water. However, for the sake of prudence, food suspected to be contaminated or showing abnormality should not be consumed.

風險傳達工作一覽 (二零一九年十一月)

Summary of Risk Communication Work (November 2019)



事故/食物安全個案
Incidents/ Food Safety Cases:
166

公眾查詢
Public Enquiries:
105

業界查詢
Trade Enquiries:
128

食物投訴
Food Complaints:
361

給業界的快速警報
Rapid Alerts to Trade:
7

給消費者的食物警報
Food Alerts to Consumers:
3

教育研討會/演講/講座/輔導
Educational Seminars/ Lectures/
Talks/ Counselling:
35

上傳到食物安全中心網頁的新訊息
New Messages Put on the
CFS Website:
60