# 食物安全焦點
# Food Safety Focus

食物安全中心
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## 本期內容 IN THIS ISSUE



## 編輯委員會 EDITORIAL BOARD



焦點個案 *Incident in Focus*

# 滑蛋烹煮及貯存溫度不當引致的沙門氏菌食物中毒個案

# *Food Poisoning Caused by Salmonella in Soft-scrambled Eggs at Improper Cooking and Holding Temperature*


**食物安全中心風險傳達組**
**科學主任葉景新先生報告**

*Reported by Mr. Kenneth YIP, Scientific Officer*
*Risk Communication Section, Centre for Food Safety*


二零一九年五月及六月，據報發生兩宗因進食滑蛋而導致食物中毒的個案，分別有7名及40名患者，他們在進食滑蛋飯或粉麵後出現腹痛、嘔吐、腹瀉及發燒徵狀，部分人需要入院。同類食物中毒個案亦曾於二零一七年及二零一八年發生。

上述個案是由於滑蛋未經徹底煮熟及/或烹煮後貯存溫度不當所致，而病原體是沙門氏菌。部分個案的現場調查發現，滑蛋煮至半熟後長時間置於室溫，未有再經加熱便上菜。這些食物事故闡明，進食未有適當加熱處理和貯存的滑蛋，存有食物安全風險。本文將探討雞蛋中的沙門氏菌從何而來，進食未經煮熟的雞蛋可引致什麼食源性疾病，以及如何降低風險。

## 沙門氏菌從何而來？來自雞還是蛋？

沙門氏菌首先感染產蛋雞，繼而污染雞蛋。在產蛋過程中或之後，糞便中的沙門氏菌可經蛋殼滲透進蛋內，使雞蛋受到污染。沙門氏菌亦可在蛋殼尚未形成之前，經受感染的生殖器官污染雞蛋。要以肉眼分辨雞蛋受到污染還是正常，並不可能。

## 進食未經煮熟雞蛋的風險

沙門氏菌能在未經煮熟的雞蛋中存活，引致食物中毒。此外，不當的貯存溫度（例如室溫攝氏25度）亦會助長在未經煮熟雞蛋之中的沙門氏菌快速繁殖。沙門氏菌感染的潛伏期由6至72小時不等，通常受感染後12至36小時會出現徵狀，包括腹痛、嘔吐、腹瀉及發燒。情況嚴重者可能會出現併發症，例如敗血症及脫水，甚至死亡，但並不常見。

## 實行食物安全五要點減低食物中毒風險

涉及蛋類菜式的沙門氏菌食物中毒個案，成因在於烹煮及貯存溫度不當，因此要特別注意食物是否徹底煮熟，並以適當溫度來貯存。為了預防食源性疾病，可採用食物安全五要點，包括：(1)精明選擇；(2)保持清潔；(3)生熟分開；(4)煮熟食物；以及(5)安全溫度。

徹底煮熟和加熱能消滅食物中的細菌，包括沙門氏菌。食物應煮熟至中心溫度至少達攝氏75度。食物煮熟後如供熱食，在上菜前應保持於攝氏60度以上，冷食則應保持於攝氏4度或以下。此外，煮熟的食物應立即食用，不應置於室溫超過2小時，如超過4小時便須棄掉。

*圖1：未經煮熟的蛋類菜式，例如滑蛋，存有沙門氏菌食物中毒風險。*
*Figure 1. Undercooked egg dishes such as soft-scrambled eggs have an inherent risk of food poisoning caused by Salmonella.*

In May and June 2019, two food poisoning outbreaks involving 7 and 40 victims respectively related to the consumption of soft-scrambled eggs were reported. The victims suffered from abdominal pain, vomiting, diarrhoea and fever after consumption of soft-scrambled eggs with either rice and pasta. Some victims required hospitalisation. Similar food poisoning cases were also reported in 2017 and 2018.

These cases were caused by inadequate cooking and/or improper holding temperature of scrambled eggs after cooking whereas *Salmonella* was the causative agent. Field investigation of some cases found that semi-cooked scrambled eggs were kept in room temperature for prolonged period. No further reheating was conducted before they were being served. These food incidents highlight the food safety risk of consuming scrambled eggs without proper heat treatment and storage condition. This article discusses the source of *Salmonella* in eggs, the foodborne illness caused by consuming undercooked eggs and ways to minimise the risk.

## What is the Source of *Salmonella*? The Hen or the Egg?

*Salmonella* infects hens and contaminates the eggs. Eggs can be contaminated by *Salmonella* through eggshell penetration from contaminated faeces during or after laying eggs. *Salmonella* can also originate from the infected reproductive organs and contaminate the egg before the shell is formed. It is not possible to distinguish contaminated eggs from normal eggs by naked eyes.

焦點個案
*Incident in Focus*


*圖2：遵從食物安全五要點配製蛋類菜式的例子。*
*Figure 2. Example of preparing egg dishes by following the Five Keys to Food Safety.*

## Risk of Consuming Undercooked Eggs

*Salmonella* causes food poisoning and can survive in undercooked eggs. In addition, improper storage temperature (eg. room temperature at 25°C) will also facilitate *Salmonella* in undercooked eggs to multiply rapidly. The incubation period is around 6 to 72 hours, usually 12 to 36 hours. Symptoms include abdominal pain, vomiting, diarrhoea and fever. For severe cases, though uncommon, complications such as septicaemia and dehydration and even death may occur.

## Implementing the Five Keys to Food Safety to Reduce Food Poisoning

As food poisoning caused by *Salmonella* in egg dishes are related to improper cooking and holding temperature, particular attention should be paid to whether the food is full cooked and kept at proper temperatures. The Five Keys to Food Safety can be adopted to prevent foodborne diseases, which include (1) Choose wisely; (2) Keep Clean; (3) Separate raw and cooked food; (4) Cook thoroughly; and (5) Keep food at safe temperature.

Thorough cooking and heating can destroy bacteria including *Salmonella*. Foods should be cooked to a core temperature of at least 75°C. Cooked foods that are served hot should be kept at above 60°C prior to serving, while cold dish should be kept at 4°C or below. Moreover, cooked foods should be consumed immediately and not be left under room temperature for more than 2 hours. If cooked food is kept at room temperature for more than 4 hours, it should be discarded.

## 注意事項

1. 沙門氏菌可在雞蛋形成的過程中將之污染。要以肉眼分辨雞蛋受到污染還是正常，並不可能。
2. 沙門氏菌能在未經煮熟的食物中存活。生吃或進食未經煮熟的蛋類菜式，存有風險。
3. 遵從食物安全五要點，可降低患上食源性疾病的風險。

## Key Points to Note

1. *Salmonella* can contaminate eggs during egg formation. It is not possible to distinguish contaminated eggs from the normal ones by naked eyes.
2. *Salmonella* can survive in undercooked food. It is risky to consume raw or undercooked egg dishes.
3. By following the Five Keys to Food Safety, the risk of suffering from foodborne illness can be minimised.

## 給消費者的建議

- 未經煮熟的蛋類菜式存有沙門氏菌污染風險。
- 選吃採用經巴士德消毒的雞蛋、蛋類製品或蛋粉配製的菜式。
- 高危人士，包括孕婦、幼童、長者及免疫力弱人士，不宜生吃或進食未經煮熟的蛋類菜式。

## Advice to Consumers

- There is an inherent risk of *Salmonella* contamination in undercooked egg dishes.
- Choose dishes prepared by pasteurised eggs, egg products or egg powder.
- High risk groups including pregnant women, young children, the elderly and immunocompromised persons are advised not to consume raw or undercooked egg dishes.

## 給業界的建議

- 遵從食物安全五要點，確保食物徹底煮熟和妥為貯存。
- 滑蛋應即點即製，避免長時間置於室溫。
- 有裂紋的雞蛋較易受到污染，應避免用來配製菜式。
- 混合攪拌而成的蛋液應即日用完，並避免添加新雞蛋。
- 選用經巴士德消毒的雞蛋來製作無需加熱處理的食品。
- 提供消費者警示，表明即食食品中有含有生或未經煮熟的食物/配料，以助消費者作出知情的選擇。例如，在標籤或標語牌上註明：「進食生或未經煮熟的食物，可能會增加患上食源性疾病的風險，尤其是孕婦、幼童、長者及免疫力弱人士。」

## Advice to the Trade

- Follow the Five Keys to Food Safety to ensure the food is thoroughly cooked and properly kept.
- Prepare scrambled eggs on a per-order basis and avoid leaving them under room temperature for a prolonged period of time.
- Avoid using cracked eggs in preparing dishes since they are more likely to be contaminated.
- Use all pooled liquid egg on the day of pooling and avoid topping up by new eggs.
- Use pasteurised eggs for food without heat treatment.
- Indicate the presence of raw or undercooked foods/ingredients in ready-to-eat items to help consumers make informed choices by providing a consumer advisory on labels or placards stating, for instance, "Consuming raw or undercooked foods may cause illness, especially for pregnant women, young children, the elderly and people with weakened immunity."

食物安全平台
Food Safety Platform

# 調味料中的加工過程污染物氯丙二醇

## The Process Contaminant 3-MCPD in Condiments

食物安全中心風險評估組
研究主任翁智仁先生報告

*Reported by Mr. Kenneth YUNG, Research Officer,*
*Risk Assessment Section, Centre for Food Safety*

豉油等調味料常用來增添食物的味道。有些調味料沿用天然發酵的古法釀製，有些則使用加酸水解植物蛋白來製造。過去每當抽驗含加酸水解植物蛋白的豉油，發現某些樣本所含的加工過程污染物氯丙二醇分量偏高時，都會引起公眾關注。

### 加酸水解植物蛋白及調味料中的氯丙二醇

採用傳統方法釀製豉油，黃豆需要經過歷時三個月至一年的天然發酵過程，才能釀出鮮味的豉油。值得留意的是，天然發酵而成的豉油不含或只含微量氯丙二醇。要縮短釀製的時間，方法之一是加入加酸水解植物蛋白，便能在較短時間內提升豉油的味道。加酸水解植物蛋白是植物蛋白質與酸進行水解而成。除豉油外，加酸水解植物蛋白亦可用作其他調味料的增味劑及配料，例如蠔油、雞粉及調味粒。在生產加酸水解植物蛋白的過程中，或會形成氯丙二醇，因此加入了加酸水解植物蛋白的調味料，可能含有氯丙二醇。

加酸水解植物蛋白由源自植物的蛋白質(例如黃豆、小麥及玉米)製成
Acid-HVPs are made from protein of plant origin (e.g. soy bean, wheat and maize)

液態及粉狀的加酸水解植物蛋白
Acid-HVPs in liquid and powder forms

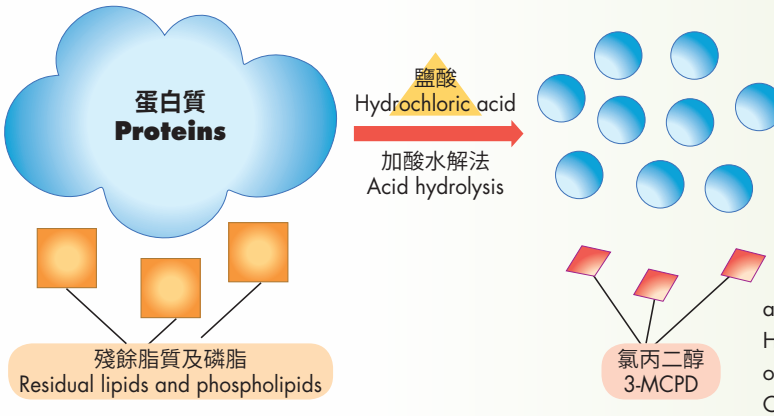


*圖3：加酸水解法是生產加酸水解植物蛋白的主要步驟。源自植物的蛋白質被鹽酸水解形成游離氨基酸，令食品有鮮味。未有從原材料去除的殘餘脂質及磷脂，在若干條件下會與鹽酸產生作用，形成氯丙二醇。*

*Figure 3. The production of acid-HVPs involve acid hydrolysis as a major step. Proteins derived from vegetable sources are hydrolysed by hydrochloric acid to form free amino acids, which give umami flavour to food products. Residual lipids and phospholipids that are not removed from the source may react with hydrochloric acid under certain conditions to form 3-MCPD.*

### 氯丙二醇對健康的不良影響

有動物研究顯示，長期攝入大量氯丙二醇，會對腎臟、中樞神經系統及雄性生殖系統造成不良影響。國際癌症研究機構把氯丙二醇列為或可能令人類患癌的第2B組物質。

### 本地情況

食物環境衞生署與消費者委員會曾進行聯合研究，發現所有調味料樣本中的氯丙二醇含量均低於食品法典委員會所訂的有關上限。近年豉油及蠔油的監測數據也顯示，在本地市面抽取的樣本中，所含的氯丙二醇分量並無超出食品法典委員會的標準。

### 如何減少調味料中的氯丙二醇

由於氯丙二醇是在食物製造過程中產生的污染物，業界宜遵循優良製造規範，把調味料中的氯丙二醇含量降至合理可行的最低水平。

Condiments such as soy sauce are often used to add flavours to food. While some of them were made by natural fermentation that have a long history of use, others were manufactured using acid-hydrolysed vegetable proteins (acid-HVPs). In the past, public concern was raised when certain acid-HVPs containing soy sauce samples were found to contain high levels of a process contaminant called 3-monochloropropane-1,2-diol (3-MCPD).

### 3-MCPD in Acid-HVPs and Condiments

The traditional production of soy sauce involves natural fermentation of soy bean and this process could take up from three months to a year to produce the desirable flavour. Of note, soy sauce made by natural fermentation does not contain or only contain trace amount of 3-MCPD. One of the ways to enhance the flavour of soy sauce within a shorter production time is the addition of acid-HVPs. Acid-HVPs are produced via the hydrolysis of vegetable proteins in the presence of an acid. Other than soy sauce, acid-HVPs may also be used as flavour enhancers and ingredients in other condiments, such as oyster sauce, chicken powder and gravy granules. 3-MCPD may be formed during the production of acid-HVPs and may be present in condiments with acid-HVPs added.

### Adverse Health Effects of 3-MCPD

Animal studies showed long term exposure to high levels of 3-MCPD caused adverse effects on kidneys, the central nervous system and male reproduction system. The International Agency for Research on Cancer classified 3-MCPD as a group 2B agent, i.e. possibly carcinogenic to humans.

### Local Situation

In previous studies conducted jointly by the Food and Environmental Hygiene Department and the Consumer Council, the level of 3-MCPD in all condiment samples were below the relevant maximum level established by the Codex Alimentarius Commission (Codex). Surveillance data of soy sauce and oyster sauce in recent years also suggested that the level of 3-MCPD in samples collected from the local market did not exceed the Codex standard.

### Ways to Reduce the Formation of 3-MCPD in Condiments

Since 3-MCPD is a contaminant that arises from food manufacturing process, the trade is advised to observe good manufacturing practice and reduce the level of 3-MCPD in condiments as low as reasonably achievable. To assist the trade in reduction of 3-MCPD in condiments, the Codex has published the "Code of Practice for the Reduction of 3-Monochloropropane-1,2-diol (3-MCPD) during the Production of Acid-HVPs and Products that Contain Acid-

為了協助業界減少調味料中的氯丙二醇，食品法典委員會發出了《有關在生產加酸水解植物蛋白及含加酸水解植物蛋白產品的過程中減少氯丙二醇的工作守則》，就如何減少加酸水解植物蛋白中的氯丙二醇提出方法，包括(但不限於)：

- 在進行加酸水解的過程中，必須同時控制溫度與加熱時間。
- 進行二次加鹼水解，可去除在加酸水解過程中形成的氯丙二醇。
- 在進行加酸水解製造加酸水解植物蛋白的過程中，使用硫酸代替鹽酸。

HVPs." Approaches to reduce the level of 3-MCPD in acid-HVPs include (but not limited to) :

- During acid hydrolysis, the temperature and the heating time must be simultaneously controlled.
- A secondary alkaline hydrolysis may remove any 3-MCPD formed during acid hydrolysis.
- Use sulphuric acid, instead of hydrochloric acid, during acid hydrolysis in manufacture of acid-HVPs.

食物事故點滴
*Food Incident Highlight*

# 刺身與衞生證明書

## Sashimi and Health Certificates

最近，某消費者組織發表研究報告，指在50個刺身樣本中檢出兩個樣本含有寄生蟲及蟲卵，結果引起市民關注。

寄生蟲可存在於海魚及淡水魚中。良好的水產養殖方法，包括提供經殺滅寄生蟲處理的飼料及養殖環境，可降低魚類感染寄生蟲的風險。此外，以特定的溫度與時間組合進行冷藏，可以殺死魚內的寄生蟲。

在現行對刺身售賣商的發牌管制下，用以配製壽司/刺身的食材，必須完好、衞生及品質優良，並由可靠及信譽良好的供應商提供。如為進口食材，必須附有出口地有關當局簽發並獲食物環境衞生署署長認可的衞生證明書，以便查察人員索閱時供其查核。

進食生的海產存有無法完全消除的微生物風險，例如感染有害細菌、病毒及寄生蟲。高危人士，包括長者、幼童、孕婦及免疫力弱人士，不宜進食生的海產。業界可按情況提供適用的消費者警示。

Recently, a consumer group's study found parasites and worm eggs in two out of 50 sashimi samples that it tested. The findings raised public concern.

Parasites can occur in both marine and freshwater fish. Good Aquaculture Practice including parasite-controlled diet and rearing environment can reduce the risk of parasite infection in fish. Furthermore, parasites in fish can be killed by freezing with specific temperature and time combinations.

Under current licensing control of the sale of sashimi, raw materials for the preparation of sushi/sashimi shall be sound, wholesome and of good quality from a reliable and reputable source. If the food materials are imported, a copy of the health certificate issued by the relevant authority of the exporting country and acceptable to the Director of Food and Environmental Hygiene shall be available for inspection by inspecting officers upon request.

The inherent microbiological risks of consuming raw seafood, for example harmful bacteria, viruses and parasites, cannot be completely eliminated. Susceptible populations, including the elderly, young children, pregnant women and people with weakened immune systems, are advised not to consume raw seafood. The trade can provide a consumer advising as appropriate.

# 屠房「日日清」以防非洲豬瘟傳播

## Daily Clearance Arrangement in Slaughterhouses to Prevent Spreading of African Swine Fever

因應香港最近發現兩宗非洲豬瘟個案，本地屠房已加強清洗消毒工作。這些措施有助防範非洲豬瘟病毒傳播。

具體而言，屠房已實施俗稱「日日清」的措施，所有運到屠房的活豬會在24小時內屠宰。在新安排下，屠房內不同位置的豬欄每日均會清空，以進行徹底清洗消毒。透過限制豬隻在屠房的逗留時間，以及有效清潔，可減少豬隻在屠房染上非洲豬瘟的機會。

非洲豬瘟是只會感染豬隻的病毒性疾病，不會傳染人類，故對人類健康並無威脅，不構成食物安全風險。徹底煮熟的豬肉可安全食用。

In view of the detection of two African Swine Fever (ASF) cases in Hong Kong recently, local slaughterhouses have strengthened cleansing and disinfection work. Such measures help prevent spreading of ASF virus.

Specifically, a daily clearance arrangement has been implemented in the slaughterhouses, whereby live pigs will be slaughtered within 24 hours upon admittance into the slaughterhouses. This new arrangement will allow lairages in different areas of the slaughterhouses to be cleared for thorough cleansing and disinfection on a daily basis. By limiting the period of stay for pigs in slaughterhouses followed by effective cleaning, the risk of infection among pigs in the slaughterhouses can be minimised.

ASF is a viral disease affecting pigs. However, this disease does not infect humans. Therefore, ASF is not a threat to human health and has no food safety risk. Thoroughly-cooked pork is safe for human consumption.

# 風險傳達工作一覽（二零一九年六月）

## Summary of Risk Communication Work (June 2019)

| | | | |
|---|---|---|---|
| 事故／食物安全個案 Incidents/ Food Safety Cases: 168 | 公眾查詢 Public Enquiries: 61 | 業界查詢 Trade Enquiries: 152 | 食物投訴 Food Complaints: 312 |
| 給業界的快速警報 Rapid Alerts to Trade: 9 | 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: 60 | 上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website: 47 |