



食物環境衛生署  
Food and Environmental  
Hygiene Department

由食物環境衛生署食物安全中心於每月第三個星期三出版  
Published by the Centre for Food Safety, Food and Environmental Hygiene Department on every third Wednesday of the month

## 本期內容 IN THIS ISSUE

### 焦點個案

精煉油脂中的有害物質縮水甘油酯

### 食物安全平台

水產動物中的金屬污染物

### 食物事故點滴

跟進美國雞蛋受沙門氏菌污染事故  
支持第二次全港性食物消費量調查

### 風險傳達工作一覽

### Incident in Focus

Glycidyl Esters, a Harmful Substance,  
in Refined Fats and Oils

### Food Safety Platform

Metallic Contaminants in Aquatic  
Animals

### Food Incident Highlight

Follow-up on the *Salmonella*  
Contamination of US Eggs Incident  
Support the Second Hong Kong  
Population-based Food Consumption  
Survey

### Summary of Risk

Communication Work

## 編輯委員會 EDITORIAL BOARD

### 總編輯

楊子橋醫生

顧問醫生(社會醫學)(風險評估及傳達)

### 行政編輯

吳志翔醫生

首席醫生(風險評估及傳達)

### 委員

梁靜勤醫生 首席醫生(風險管理)

陳詩寧獸醫 高級獸醫師(獸醫公共衛生)

張瑞珍女士 高級總監(食物安全中心)

嚴家義先生 高級總監(食物安全中心)

區嘉敏醫生 高級醫生(風險評估)

鍾偉祥博士 高級化驗師(食物研究化驗所)

### Editor-in-chief

Dr. Samuel YEUNG

Consultant (Community Medicine)  
(Risk Assessment and Communication)

### Executive Editor

Dr. Henry NG

Principal Medical Officer  
(Risk Assessment and Communication)

### Members

Dr. Jackie LEUNG

Principal Medical Officer (Risk Management)

Dr. Allen CHAN

Senior Veterinary Officer  
(Veterinary Public Health)

Ms. Syndia CHEUNG

Senior Superintendent (Centre for Food Safety)

Mr. K Y YIM

Senior Superintendent (Centre for Food Safety)

Dr. K M AU

Senior Medical Officer (Risk Assessment)

Dr. Stephen CHUNG

Senior Chemist (Food Research Laboratory)

## 焦點個案 Incident in Focus

## 精煉油脂中的有害物質縮水甘油酯

## Glycidyl Esters, a Harmful Substance, in Refined Fats and Oils

食物安全中心風險評估組  
科學主任游天頌先生報告

Reported by Mr. Arthur YAU, Scientific Officer,  
Risk Assessment Section, Centre for Food Safety

### 背景

二零一八年四月十六日,某本地機構撰文發布有關香港出售的牛油、人造牛油、人造牛油塗抹醬及起酥油的縮水甘油酯的研究結果,顯示大部分人造牛油、人造牛油塗抹醬、牛油和植物油脂肪混合物、起酥油的樣本均含有縮水甘油酯,而所有牛油樣本卻未檢出縮水甘油酯。本文旨在討論縮水甘油酯如何在一些油脂形成,縮水甘油酯對健康造成的影響,以及國際間正如何處理有關問題。

### Background

On 16 April 2018, a local organisation published an article on the result of its study on butter, margarine, fat spreads and shortenings in Hong Kong, which revealed that glycidyl esters (GEs) were found in most margarine, fat spreads, fat blends and shortenings samples, and were not detected in all butter samples. This article aims to discuss how GEs are formed in some fats and oils, the health effects and what is being done on the issue internationally.

### 牛油與人造牛油及人造牛油塗抹醬的比較

牛油不經精煉,是透過把脂肪從牛奶分隔出來而製成的油脂產品。另一方面,人造牛油及其他人造牛油塗抹醬為可供塗抹的脂肪產品,在室溫下保持固體狀。人造牛油及人造牛油塗抹醬可使用多種精煉脂肪及油作配料,可能含有縮水甘油酯。

### Butter versus Margarine and Fat Spreads

Butter is a fatty emulsion derived through physical separation of fat from milk, where no refining is required. On the other hand, margarine and other fat spreads are spreadable fat emulsions that remain solid at room temperature. They can use many different types of refined fats and oils as ingredients, which may contain GEs.

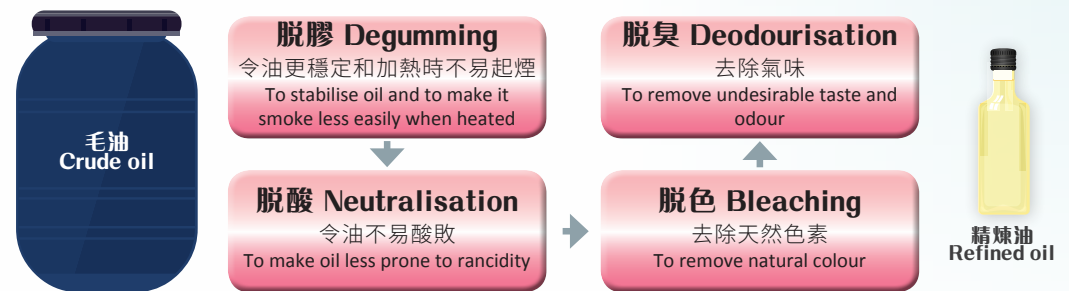


圖1:食用油脂的精煉過程。 Figure 1: Refining of edible fats and oils.

### 什麼是縮水甘油酯?

縮水甘油酯是精煉油脂的加工過程污染物。含有精煉油脂的食物亦會有縮水甘油酯。油脂在精煉過程中進行脫臭步驟時(見圖1),若溫度超過攝氏200度,天然存在於毛油內的部分化學品前體可與油中的其他化合物產生作用。尤其值得關注的問題是,若干類別的植物油脂(例如棕櫚油)較其他油類含有較高水平

### What are GEs?

GEs are process contaminants which are found in refined fats and oils. They also appear in food that contains these refined fats and oils. When fats and oils undergo the deodorisation step during the refining process (see Figure 1), some of the chemical precursors that are naturally present in the crude oil can react with other compounds in oil at temperatures in excess of 200°C. This issue is of particular

焦點個案  
Incident in Focus

的前體，在精煉過程中，只要情況適當，更大量的縮水甘油酯便能形成。

人們進食後，食物中的縮水甘油酯會在消化過程中分解，導致縮水甘油酯差不多完全釋放。縮水甘油酯是毒性基因致癌物，故應設法將食物中的縮水甘油酯維持在可合理做到的盡可能低水平。現有多種可行方法，能在不同的製油階段減少縮水甘油酯含量。事實上，油脂對人類吸收脂溶性維他命是不可或缺，故應屬健康飲食的一部分。在健康飲食中，[油脂應佔攝入能量的20至30%](#)，其中[少於10%能量應從飽和脂肪攝入](#)。事實上，根據健康飲食金字塔，我們應盡量少吃脂肪及油。

### 國際間在制訂標準及預防措施方面的進展

食品法典委員會現時仍未就食物中的縮水甘油酯制訂任何最高含量。歐洲聯盟最近於二零一八年二月把指定食物(包括植物油)中的縮水甘油酯的最高含量訂定為最高達每公斤1000微克(以縮水甘油計)。

另一方面，食品法典委員會正草擬實務守則，以減少食物中的縮水甘油酯及3-單氯丙二醇酯的含量，預計於二零二零年完成。雖然有關實務守則仍在編製中，但守則正集中探討透過選擇縮水甘油酯前體含量較少的油料作物品種、選擇氯化物含量較少的肥料、在適合的成熟度收割以免脂質過度分解，以及使用正確的加工參數(例如在食用油的精煉過程中以較低溫度進行脫臭)等方法，減少油脂在縮水甘油酯形成時含有的前體。食品法典委員會報告中指出，較佳的做法應是在加工初期去除縮水甘油酯前體，而非只集中在煉油過程中處理。食物安全中心會繼續密切監察實務守則的編製進度，並會向業界更新情況。

#### 注意事項：

1. 縮水甘油酯是若干植物油在精煉過程中產生的加工過程污染物。
2. 縮水甘油酯的含量可透過不同方法(由使用不同的耕種方式至加工參數不等)而有所減少。
3. 縮水甘油酯的攝入量應維持在盡可能低的水平。

#### 給業界的建議：

- 在加工過程及採購食用植物油期間確保採取足夠預防措施，以減少食用油脂中的縮水甘油酯含量。

#### 給市民的建議：

- 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。
- 人們應保持均衡飲食，進食不同種類的食物，減低因偏食種類不多的食品而攝入污染物的風險。此外，在家以新鮮配料烹調食物能減少食用含相關油脂的加工食品的機會。

concern in certain types of vegetable fats and oils (e.g. palm oil) which has higher levels of the precursors than other oils, where more GEs can be formed when the right conditions are met during refining.

GEs are broken down during digestion, after consumption resulting in an almost complete release of glycidol. Glycidol is a genotoxic carcinogen and it is best to keep the level of GE in food as low as reasonably achievable. There are possible measures that can reduce the level of GE during various states in oil production. In fact, fats and oils should be part of a healthy diet as they are essential in the absorption of fat-soluble vitamins. The [contribution of fats and oils to energy intake](#) should be kept within 20 to 30%, and among them, [less than 10% of energy intake should be from saturated fat](#) in a healthy diet. In practice, we should eat less fats and oils as far as possible with reference to the food pyramid.

### International Developments in Standards and Preventive Measures

Currently, the Codex Alimentarius Committee (Codex) has not set any maximum levels for GEs in food. The European Union has recently, in February 2018, set maximum levels for GEs at up to 1000 µg/kg (expressed as glycidol) in specified foods, including vegetable fats and oils.

On the other hand, the Codex is developing a Code of Practice (CoP) in reducing the levels of GEs and 3-MCPD esters in food, which is expected to be finalised by 2020. Although the CoP is still under development, it currently focuses on reducing the precursors in the formation of GEs in fats and oils through selection of varieties of oil crops that contain less GEs precursors, selection of fertilisers with less chloride, harvest at the right maturity to avoid excessive breakdown of lipids, and the use of right processing parameters (e.g. lower temperature during deodourisation during refining of edible oil), etc. The Codex reported that it may be better to remove the precursors to GEs at earlier stages of processing than just focusing on the oil refining process. The Centre for Food Safety will keep monitoring the development of the CoP closely and update the trade accordingly.

#### Key Points to Note:

1. GEs are process contaminants that are formed during the refining of certain vegetable oils.
2. The levels of GEs can be reduced through different approaches ranging from farming practices to processing parameters.
3. The intake of GEs should be kept as low as practically possible.

#### Advice to Trade:

- Take adequate precautions to ensure that the GEs level in edible fats and oils is reduced as much as practicable during processing and during sourcing of edible vegetable oils.

#### Advice to Public:

- Although fats and oils are essential in the absorption of fat-soluble vitamins, we should eat less fats and oils as far as possible with reference to the food pyramid in practice.
- One can maintain a balanced diet and to consume a wide varieties of food in order to minimise risk from exposure to contaminants from a limited range of food items. Also, preparing home food with fresh ingredients can reduce your chance of consuming processed food items that contain concerned fats and oils.

# 水產動物中的金屬污染物

## Metallic Contaminants in Aquatic Animals

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

本文為一系列有關訂定食物中金屬污染物標準的最後一篇文章，將集中探討水產動物。汞、砷及鎘為天然存在於地殼的金屬，可透過不同自然過程或人類活動釋放於水生環境當中，然後被水產動物吸收（見圖2）。

This article, being the last in the series on setting standards for metallic contaminants in food, will focus on aquatic animals. Metals such as [mercury](#), [arsenic](#) and [cadmium](#) occur naturally in the earth crust. They can be released to the aquatic environment through various natural processes or human activities and then taken up by aquatic animals (see Figure 2).

### 訂定魚類中汞的含量標準

汞以多種型態存在於環境當中，分別是元素汞（金屬汞）、無機汞及有機汞。於淡水或海水中的無機汞可被微生物轉化為有機汞，然後被水產動物吸收。甲基汞是最受關注的一種有機汞，因甲基汞比元素汞和無機汞對人類健康造成的損害更大。對胎兒、嬰兒及兒童來說，甲基汞對健康的主要影響是導致神經發育受損。孕婦從膳食中攝入甲基汞，腹中胎兒便會攝入甲基汞，對胎兒發育中的腦部及神經系統可造成不良影響。魚類是甲基汞的主要膳食來源。一般而言，大部分魚類的甲基汞含量佔總汞含量90%以上。

現時食品法典委員會就魚類（捕獵魚類除外）和捕獵魚類的甲基汞指引限值分別訂定為每公斤0.5毫克及每公斤1毫克。食品法典委員會的指引限值是指該委員會建議可在國際貿易市場上流通的食品中某種物質的含量上限。

除了參考食品法典委員會的指引限值外，政府最近檢討本地的食物中金屬污染物含量標準時亦已考慮到本港情況。香港首個總膳食研究報告顯示，約有11%的育齡（20至49歲）女性的甲基汞膳食攝入量超出相關健康參考值。考慮到甲基汞在懷孕時對胎兒的健康可能帶來的潛在風險，政府建議把魚類（包括捕獵魚類）的甲基汞最高含量訂為每公斤0.5毫克。有關建議就捕獵魚類而言，較食品法典委員會每公斤1毫克的甲基汞指引限值嚴格，以致在充分保障市民健康及盡量減低對本港魚類供應影響之間取得平衡。

### 訂定水產動物中砷及鎘的含量標準

釋放於水生環境中的砷及鎘可被水產動物吸收，並透過食物鏈累積。政府最近檢討本地的食物中金屬污染物含量標準時，已參考食品法典委員會的“可合理做到的盡可能低水平”的原則以建議水產動物中金屬污染物的最高含量。

總而言之，根據食物安全中心以往的恆常食物監察計劃和額外進行的基線研究的結果顯示，少於5%的有關食物組別中金屬污染物含量檢測結果超出建議最高含量，這符合食品法典委員會在釐定食物安全標準時的做法。不過，若干品種的水產動物可能含有較高水平的金屬污染物。

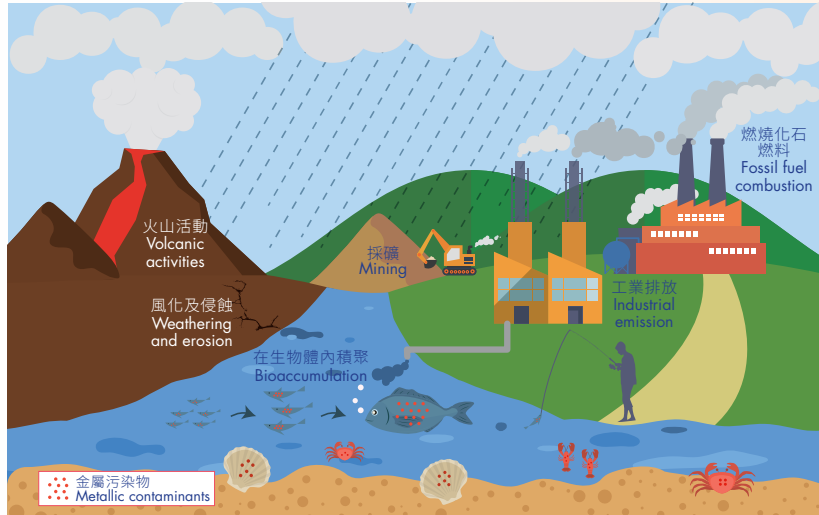


圖2：水生環境中金屬污染物的來源。一些金屬污染物往往會在生物體內積聚，並透過食物鏈累積，例如捕獵魚類比非捕獵魚類更可能累積較高含量的甲基汞（一種有機汞）。  
Figure 2: Sources of metallic contaminants in the aquatic environment. Some metallic contaminants tend to bioaccumulate in the food chain, for example, predatory fish are more likely to accumulate higher amounts of methylmercury (an organic mercury) than non-predatory fish species.

contributes more than 90% of the total mercury content in most fish.

Currently, the Codex Alimentarius Commission (Codex) has established guideline levels (GLs) for methylmercury in fish (other than predatory fish) and predatory fish at 0.5 mg/kg and 1 mg/kg, respectively. A Codex GL is the maximum level (ML) of a substance in a food or feed commodity which is recommended by the Codex to be acceptable for commodities moving in international trade.

Apart from the Codex GL, local situation has also been considered in the recent review of the local standards for metallic contamination in food. The first Hong Kong Total Diet Study revealed that about 11% of women of childbearing age (aged 20-49) had dietary exposure to methylmercury exceeded the relevant health based guidance value in the local setting. Taking into account the potential health risks to the foetus upon methylmercury exposure during pregnancy, an ML of 0.5 mg/kg for methylmercury in fish (including predatory fish) is proposed. This proposed ML is more stringent than the Codex GL of 1 mg/kg for methylmercury in predatory fish, so as to strike a balance between adequate public health protection and having minimal impact on the supply of fish to Hong Kong.

### Setting Standards for Arsenic and Cadmium in Aquatic Animals

Arsenic and cadmium released to the aquatic environment can be taken up by aquatic animals and accumulate in the food chain. In the recent review of the local standards for metallic contamination in food, the “as low as reasonably achievable” (ALARA) principle of Codex has been taken into consideration for the proposed MLs for metallic contaminants including arsenic and cadmium in aquatic animals.

In general, according to past results of the routine food surveillance programme and additional baseline studies of the Centre for Food Safety, less than 5% of the test results for levels of metallic contamination for the concerned food groups were found exceeding the proposed MLs. This is in line with the Codex approach in setting food safety standards. However, certain species of aquatic animals may contain higher levels of metallic contaminants. For instance, *Amusium* scallops may contain higher levels of inorganic arsenic. On the other hand,

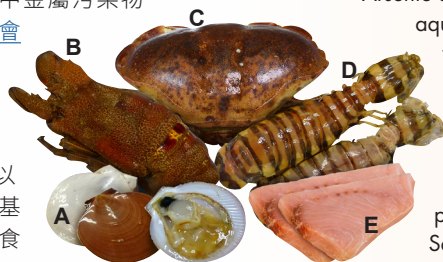


圖3：(A) 日月貝屬的扇貝、(B) 琵琶蝦、(C) 棕褐螃蟹、(D) 斑馬瀨尿蝦；以及(E) 劍魚柳。  
Figure 3: (A) *Amusium* scallops, (B) bay lobster, (C) brown crab, (D) zebra mantis shrimps, and (E) swordfish fillets.

例如，日月貝屬(*Amusium*)的扇貝的無機砷含量可能較高。另一方面，琵琶蝦(即*Thenus*屬)、棕褐螃蟹、斑馬瀨尿蝦及劍魚的鎘含量可能較高(見圖3)。

### 三方合作保障食物安全

食物安全是社會各階層的共同責任，有賴政府、食物業界與消費者三方積極合作。除了政府透過食物監察計劃定期監察食物中的金屬污染物含量和檢討相關的本地標準外，食物業界在食物安全方面亦擔當重要的角色，以確保其遵守相關的法例及規定，以及採購可供安全食用的食品。消費者可向可靠的店舖購買食物，並避免進食高風險食物，以保障自己。他們亦應保持均衡及多元化的飲食，避免因偏食幾類食品而攝入過量的金屬污染物。

bay lobsters (i.e. *Thenus* species), brown crabs, zebra mantis shrimps and swordfish may contain higher levels of cadmium (see Figure 3).

### Tripartite Collaboration for Food Safety

Food safety is a shared responsibility which involves proactive tripartite collaboration of the Government, the food trade and consumers. Apart from the Government's routine monitoring of metallic contamination in food through the Food Surveillance Programme and review on the relevant local standards, the food trade also plays a vital role in food safety to ensure compliance with the requirements of relevant laws and regulations and source foods that are safe for consumption. Consumers could protect themselves by purchasing food from reliable retailers and avoiding the consumption of high risk food. They should also maintain a balanced and varied diet to avoid excessive exposure to metallic contaminants from a small range of food items.



## 跟進美國雞蛋受沙門氏菌污染事故

### Follow-up on the *Salmonella* Contamination of US Eggs Incident

食物安全中心(中心)透過食物事故監察系統，得悉位於美國北卡羅來納州一間廠房因其出產的雞蛋受沙門氏菌污染而進行回收。中心即時暫停涉事廠房出產的禽蛋進口香港。中心進一步調查發現若干本地進口商曾進口涉事雞蛋。相關進口商已按中心建議即時進行回收，並停止使用/出售有關產品。

感染沙門氏菌可引致發燒及腸胃不適，高風險人士受感染可能會有較嚴重的影響。消費者(特別是長者、嬰兒、孕婦及免疫力較低人士)應避免進食生或未經徹底煮熟的雞蛋及蛋類製品。徹底煮熟食物可消滅沙門氏菌。雞蛋應徹底煮熟至蛋黃及蛋白完全凝固。配製無須進一步熱處理的食品時，應選用經巴士德消毒法消毒的蛋或蛋類製品。

中心已就事故聯絡美國有關當局，並會繼續跟進事故及採取適當行動。

The Centre for Food Safety (CFS), through its Food Incident Surveillance System, noted a plant in North Carolina, US was recalling eggs it produced due to *Salmonella* contamination. The CFS has immediately suspended the import into Hong Kong of the poultry eggs from the plant concerned. Further investigation found certain local importers had imported the affected eggs. The concerned importers conducted a recall according to the CFS' advice and stopped using/selling the products immediately.

*Salmonella* infection may cause fever and gastrointestinal upset. The infection in vulnerable groups could be more severe. Consumers, particularly the elderly, infants, pregnant women and immuno-compromised people, should avoid eating raw or inadequately cooked eggs and egg products. *Salmonella* can be killed by thorough cooking. Eggs should be thoroughly cooked until the yolk and white are firm. Choose eggs or egg products treated by pasteurisation to prepare dishes not requiring further heat treatment.

The CFS has contacted the US authorities concerned over the incident. It will continue to follow up on the incident and take appropriate action.

## 支持第二次全港性食物消費量調查

### Support the Second Hong Kong Population-based Food Consumption Survey

食物安全中心(中心)於四月十三日展開為期約一年的第二次全港性食物消費量調查的主要實地調查工作。是次調查的目的，是收集本港人口食物消費量的最新資料。調查收集所得的數據(包括食物類別及分量)將用作評估市民從膳食攝入不同的食物有害物所面對的風險。

中心會在一年內分批向獲選住戶發出邀請信，闡釋訪問的安排。中心已委託政策二十一有限公司通過進行兩次訪問收集每位受訪者的調查數據。調查結果只會以整體人口食物消費量模式發布。個人資料將會嚴加保密，並按既定做法處理，以保障私隱。

公眾的積極參與確保調查結果可靠，並有助加強香港的食物安全。中心呼籲獲選住戶積極配合，在接獲邀請信後致電政策二十一辦事處(68975709；每日早上9時至晚上10時)，以便預約訪問時間。

The Centre for Food Safety (CFS) commenced the main fieldwork of the [Second Hong Kong Population-based Food Consumption Survey](#) on 13 April, which will last for around a year. Its objective is to collect up-to-date food consumption information of Hong Kong people. Collected survey data covering types and amounts of food consumed will then be used to assess if the public is exposed to any dietary risks from various food hazards.

[Invitation letters](#) will be issued in batches within a year to selected households to explain the interview arrangement. Policy 21 Limited is commissioned to collect the survey data by two interviews with each respondent. Survey results will be published only as the overall population food consumption patterns. Personal information will be kept strictly confidential and handled according to the established practice to protect privacy.

Active public participation is essential in ensuring the reliability of the survey results and will help enhance food safety in Hong Kong. The CFS appeals to the selected households to actively respond by calling the Policy 21 office (68975709, 9am-10pm daily) to schedule times for the interviews upon receipt of the invitation letter.



## 風險傳達工作一覽 (二零一八年四月)

### Summary of Risk Communication Work (April 2018)

事故/食物安全個案 Incidents/ Food Safety Cases: 141	公眾查詢 Public Enquiries: 126	業界查詢 Trade Enquiries: 164	食物投訴 Food Complaints: 439
給業界的快速警報 Rapid Alerts to Trade: 10	給消費者的食物警報 Food Alerts to Consumers: 6	教育研討會/演講/講座/輔導 Educational Seminars/ Lectures/ Talks/ Counselling: 28	上傳到食物安全中心網頁的新訊息 New Messages Put on the CFS Website: 66