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## 焦點個案 Incident in Focus

## 氰化物與食物安全

## Cyanides and Food Safety

食物安全中心

風險評估組

科學主任朱源強先生報告

Reported by Mr. Johnny CHU, Scientific Officer,  
Risk Assessment Section,  
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二零一五年八月十二日，天津一個貯存危險化學品的倉庫發生大爆炸，市民擔心當地的空氣、水和食物會被這些化學品，尤其是氰化物污染。本文將就食物中的氰化物，其安全性及規管情況作一探討。

On 12 August 2015, massive explosions devastated a warehouse holding containers of dangerous chemicals in Tianjin. The public are worried that these chemicals, especially cyanides, might pollute the air, the water and the food in the area. This article discusses the occurrence, safety and regulations of cyanides in foods.

### 食物中的氰化物

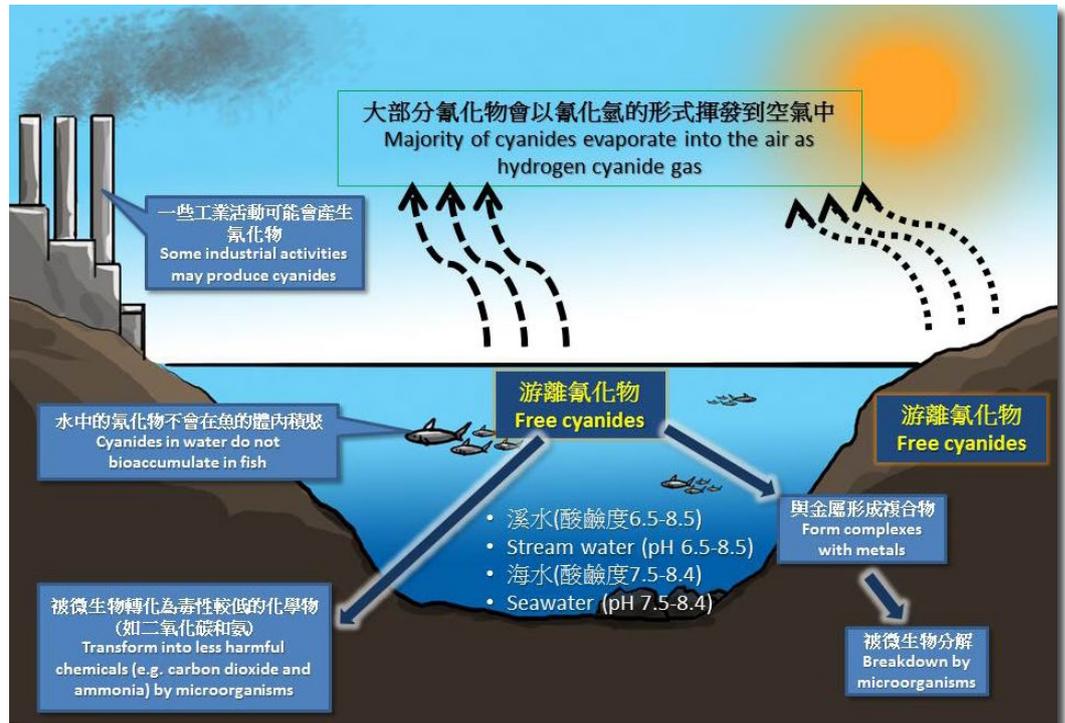
氰化氫(一種無色氣體)和氰化鉀(一種固體)都是常見的氰化物。當氰化氫溶於水時稱為氫氰酸。氰化物會由自然過程(如火山、山火及微生物活動等)及工業活動(如電鍍、冶金、紡織品及塑膠生產等)進入空氣、水和土壤。

### Cyanides and Their Occurrence in Foods

Hydrogen cyanide (a colourless gas) and potassium cyanide (a solid) are common examples of cyanides and a solution of hydrogen cyanide in water is called hydrocyanic acid. Cyanides enter air, water, and soil from natural processes (e.g. volcanoes, wildfire and microbiological activities) and industrial activities (e.g. electroplating, gold mining, production of textiles and plastics, etc.).

氰化物很少留在水和土壤中，原因是大部分液態氰化物在酸鹼度低於9.2時都會揮發成氰化氫，另外有部分會被微生物轉化為毒性較低的化學物(如二氧化碳和氨)或與金屬形成複合物。氰化物對植物有毒，但目前對植物攝入氰化物的情況所知不多。氰化氫是弱酸，當蔬果濕潤的表面留有大量氰化氫時，會對蔬果造成腐蝕、凋萎和變色，令產品的賣相欠佳。

Cyanides seldom persist in surface waters and soils because at pH < 9.2, most cyanides in solution will evaporate as gaseous hydrogen cyanide and some will be transformed into less harmful chemicals (e.g. carbon dioxide and ammonia) by microorganisms, or will form complexes with metals. Cyanides are toxic to plants; however, not much is known about the uptake of cyanides into plants. Being a weak acid, hydrogen cyanide, when deposited a lot on wet surfaces of vegetables and fruits, may cause burning, wilting or discolouration, making these products unmarketable.



氰化物在環境中的去向簡圖

A simplified diagram showing the environmental fate of cyanides.

含氰化物的物質天然存在於2 000多種植物中，其中有些是食用植物，例如竹筍、木薯及蘋果、杏、梨、李子(布祿)、梅、櫻桃、桃等的種子 and 果核。在這些植物中，氰化物通

Cyanide-containing substances occur naturally in over 2 000 plant species; some of these are food plants such as bamboo shoots, cassavas and seeds or stones of apples, apricots, pears, plums, prunes, cherries, peaches, etc. In these plants, cyanides are bound to sugar molecules in the form of cyanogenic glycosides.

焦點個案  
Incident in Focus

常與糖分子結合，並以氰甙的形式存在。氰甙本身可說是沒有毒性的，不過無毒的氰甙在腸道中會被分解為有毒的氰化氫。兒童是較易受影響的一羣，他們只須咀嚼幾顆這些植物的種子，便可能會中氰化物毒。用沸水徹底烹煮含氰甙的植物，可有效地降低毒素。

極少量的氰化物就能令生物中毒，據文獻記載魚是對氰化物最敏感的海洋生物。不過，水中的氰化物可能因為迅速轉化的關係，不會在生物(包括魚)體內積聚。引致家畜氰化物中毒最常見的原因是吃了含氰甙的植物。歐洲食物安全局指出，只要動物不是氰化氫中毒，肉類、蛋或奶類中的氰化物含量應是極小的。

### 對健康的影響

氰化物會抑制細胞的呼吸作用，因而對人類和動物有害。人類氰化物急性中毒的症狀包括嘔吐、噁心、頭痛、頭昏眼花、心搏徐緩、抽搐、呼吸衰竭，最終可導致死亡。短期症狀通常於吸入氰化物或吃下含氰化物的食物後數分鐘內出現。

### 規管情況

食品法典委員會對木薯粉和加里(英文名稱為gari，一種用木薯粉製成的非洲食品)中氫氰酸的最高限值分別為每公斤10毫克及每公斤2毫克。在歐盟，氫氰酸在烏結糖和杏仁糖膏中的最高准許含量是每公斤50毫克；酒精類飲品是每公斤35毫克；罐裝核果則是每公斤5毫克。本港法例對食物中的氰化物並無明文規定，不過，所有在香港出售的食物必須適宜供人食用。

### 中心採取的行動

食物安全中心(中心)一直就天津爆炸事故與內地有關部門保持密切聯繫。天津的供港註冊農場自今年年初起並無蔬果或活生水產到港。中心資料顯示，天津自爆炸事故後並無向本港供應牛隻。為釋公眾疑慮，中心已抽驗天津鄰近地區出產的20個供港食品樣本(包括蔬菜和水果)，所有樣本均不含氰化物。

#### 注意要點

- 大部分水中或土壤中的氰化物都會以氰化氫的形式揮發到空氣中。
- 氰化物不會在生物體內積聚，也不會持續存在環境中。
- 一些食用植物天然存在含氰化物的物質。

### 給業界的建議

1. 密切留意有關食物安全的訊息，並向可靠的來源採購食物和配料。
2. 確保所出售或進口的食品適宜供人食用，並符合本港法例標準。

### 給市民的建議

1. 保持均衡飲食，以免因偏食幾類食品而過量攝取有害的物質。
2. 小心處理含氰甙的食用植物，以減低中毒風險：
  - (i) 把含氰甙的植物(如竹筍)切成小塊，並以沸水徹底烹煮；
  - (ii) 切勿進食或咀嚼蘋果、杏、梨、李子等水果的種子和果核。

Cyanogenic glycosides *per se* are relatively non-toxic; however, they are converted into toxic hydrogen cyanide in the intestinal tract. Young children are more susceptible and chewing only a few seeds of these plants may cause cyanide poisoning. Cooking cyanogenic plants thoroughly in boiling water can effectively reduce their toxicity levels.

Cyanides are toxic to living organisms at very low concentrations and fish is the most cyanide-sensitive group of aquatic organisms reported in the literature. Nonetheless, cyanides in water do not bioaccumulate in living organisms including fish, probably owing to their rapid transformation. The most frequent cause of cyanide poisoning in livestock is through ingestion of plants containing cyanogenic glycosides. However, according to the European Food Safety Authority, provided the animal is not intoxicated with hydrogen cyanide, the levels in meat, eggs or milk intended for human consumption can be expected to be very low in all food producing animals.

### 氰化物捕魚法 Cyanide Fishing

使用氰化物捕魚在大部分國家是違法的，但在一些地區仍然禁之不絕。潛水員把氰化物噴進珊瑚礁叢中，令魚失去知覺而被活捉。捕獲的魚主要供應給水族館，部分成為人類的盤中餐。雖然沒有證據顯示食用以這種方法捕獲的魚會中毒，但使用氰化物捕魚會殺死生態系統中的其他生物，並對珊瑚礁造成嚴重損害。

*Despite being illegal in most countries, cyanide fishing, whereby divers squirt cyanide into reef crevices to stun fish without killing them, is reportedly practised in some regions. The captured fish is mainly for the marine aquarium trade and sometimes for human consumption. Although there is no evidence of poisoning of people who eat cyanide-caught fish, the use of cyanide to catch fish kills other organisms in the ecosystem, leading to massive coral reef destruction.*

### Public Health Significance

Cyanides are toxic to humans and animals due to their ability to inhibit cell respiration. Acute toxicity in human is characterised by symptoms such as vomiting, nausea, headache, dizziness, difficulty in vision, slow heart rate, convulsion, respiratory failure and may finally result in death. Symptoms of short term effects usually occur within minutes after breathing cyanides or eating foods that contain them.

### Regulatory Control

Codex Alimentarius Commission has established maximum levels of 10 mg/kg and 2 mg/kg (as hydrocyanic acid) for cassava flour and gari respectively. In EU, the maximum permitted levels of hydrocyanic acid are 50 mg/kg in nougat and marzipan, 35 mg/kg in alcoholic beverages and 5 mg/kg in canned stone fruits. There is no specific regulation on cyanide in foods stipulated in the laws of Hong Kong; nevertheless, all foods for sale in Hong Kong must be fit for human consumption.

### Actions Taken

Regarding the explosions in Tianjin, the Centre for Food Safety (CFS) has been maintaining close contact with the relevant Mainland authorities; no vegetables, fruits or live edible aquatic animals from registered farms in Tianjin have been exported to Hong Kong since early this year. CFS' information also shows that no cattle have been imported from Tianjin since the explosion incident. To allay public concerns, the CFS also took 20 samples (e.g. vegetables and fruits) originating from areas around Tianjin for testing and cyanide was not detected in any of these samples.

### Key Points to Note

- Most cyanides in water or in soils will evaporate into the air in the form of gaseous hydrogen cyanide.
- Cyanides do not bioaccumulate in living organisms or persist in the environment.
- Cyanide-containing substances occur naturally in some food plants.

### Advice to the Trade

1. Keep vigilance to issues related to food safety and obtain food supplies from reliable sources.
2. Ensure foods imported or for sale are fit for human consumption and comply with legal standards.

### Advice to the Public

1. Maintain a balanced diet so as to avoid excessive exposure to harmful substances from a small range of food items.
2. Handle cyanogenic food plants with care to reduce the risk of poisoning:
  - (i) Cut cyanogenic food plants (e.g. bamboo shoots) into small pieces and cook them thoroughly in boiling water;
  - (ii) Do not eat or chew seeds or stones of apples, apricots, pears, plums, etc.

# 油脂是什麼？ Fats and Oils – What Are They?

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

油脂是我們飲食的重要部分，除了能夠提供人體所需的脂肪酸和大量能量外，還能為食物增添獨特的風味，在烹調中有不能替代的作用。舉例來說，油是炸食物用的媒介；製作餡餅時添加脂肪(起酥油)能避免麵粉和其他配料粘着在一起。

## 油脂是什麼？

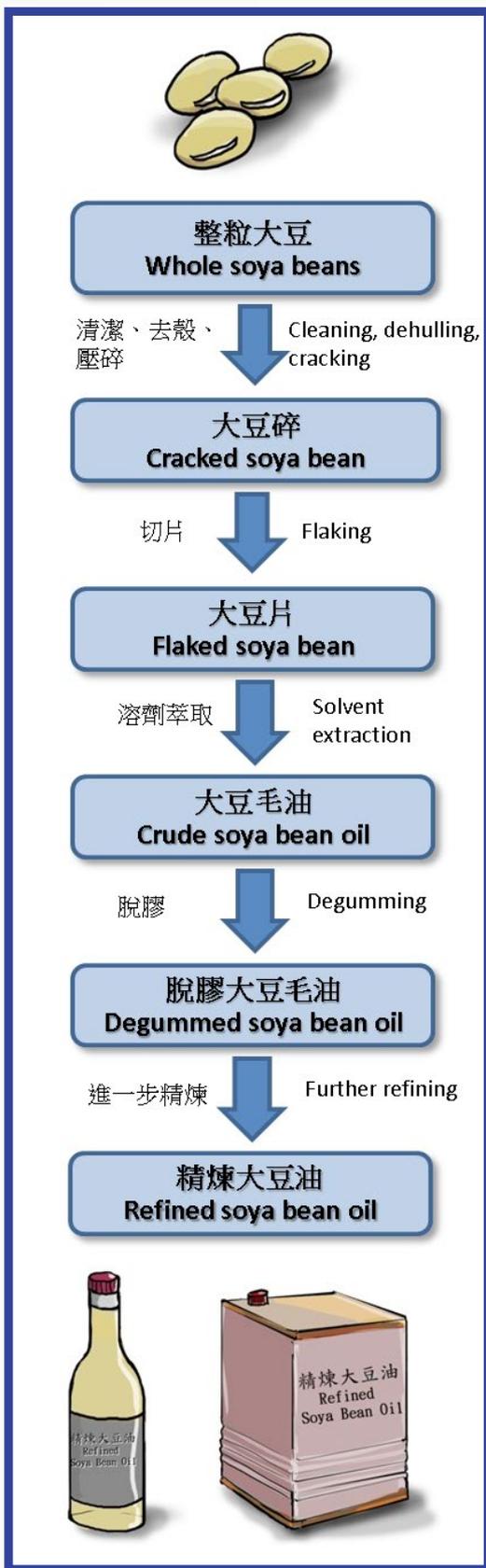
有些人以為脂肪和油是兩種不同的東西。但事實上，兩者的化學結構是一樣的，特性也相若。脂肪和油的差別在於型態，我們一般把常溫下是固體的稱作脂肪，而把常溫下是液體的稱作油。從化學的結構來看，每個脂肪或油分子都是由三個長鏈脂肪酸分子和一個甘油分子結合而成的。油脂可從植物、陸上動物或海洋動物身上提取。油脂天然存在少量次要成分。由於生物靠脂肪/油儲存能量，很多動植物體內都有油脂。油一般源自粟米、花生、大豆、菜籽、橄欖及棕櫚核仁等產油植物，而脂肪則大都取自於動物，如奶類(牛油)、牛(牛脂)和豬(豬油)等。魚類等海洋動物也是油脂的來源之一。雖然牛油、人造牛油和可可脂含有脂肪，但根據國際食物標準及安全機構食品法典委員的分類，它們不屬於油脂，受不同的標準規管。脂肪酸分子的不同決定了脂肪的不同特性和穩定性。

## 油脂加工

提取油是用物理方式(如壓榨)、化學方式(如用溶劑萃取)或兩者兼用的方式從原材料中取得毛油。大部分毛油會再進一步加工，以便達到所需的品質和特性。加工過程可去除原材料中不良和有害的物質。

提取動物脂肪則是利用熱水或蒸氣融化動物的脂肪組織，融化出來的脂肪會浮在水面而被提取，而不要的肉組織會沈澱在水底。

從植物中取油必須先篩出有瑕疵的原材料，然後把合適



大豆油的加工過程示例  
An example of soya bean oil processing

Fats and oils contribute to an important part of our diet. They are a source of essential fatty acids and a concentrated source of energy in terms of human nutrition. On the other hand, fats and oils can also provide distinctive flavours to food and provide unique and desirable functions during cooking. For example, oils are the frying media for deep fried food; and when making pastries, fats (shortenings) are added to prevent the flour and other ingredients from clumping together.

## What Are Fats and Oils?

Some people think that fats and oils are different things. But in reality, they share a common chemical structure and similar properties. The difference is that those that stay solid at room temperatures are called fats while those that stay liquid at room temperatures are called oils. Chemically, each fat or oil molecule consists of three long strings of fatty acid molecules combined with a glycerol molecule. Fats and oils may originate from plants, land or marine animals. Fats and oils may contain small amounts of other minor components that are naturally present. As fats and oils are produced by organisms as a way to store energy, they are found in a wide range of plants and animals.

Oils are commonly obtained from oil-producing plants like corn, peanuts, soya beans, vegetable seeds, olives, palm kernels, whilst fats are more commonly obtained from animal sources like milk (butter), beef (tallow), pork (lard), etc. Fats and oils can also be obtained from marine sources like fish. Although butter, margarine and cocoa butter contain fats, they are defined and specified separately under standards other than fats and oils by the Codex Alimentarius Commission, the international food standards and safety authority. The differences in the fatty acid molecules attached can contribute to the properties and stability of the fat.

## Processing of Fats and Oils

During the processing of oils, crude oil is extracted from the raw materials through physical means (e.g. pressing), chemical means (e.g. extraction by solvents) or a combination of both methods. Many of them are then further processed so that the desired quality and properties can be obtained in the product. Undesirable and harmful substances in the raw materials, if present, can also be removed during processing.

In obtaining animal fats, fatty parts of the animals are melted in hot water or steam. The melted fat rises on top of the water and is removed, while the unwanted meat tissues settle to the bottom.

For obtaining oils from plant materials,

的製油原料壓碎和磨粉，再用壓榨及／或無毒溶劑(如己烷)萃取的方法提油。取出的毛油可以如上圖所示進一步加工。

下兩期我們會繼續探討油脂的品質、安全性、營養與健康等問題。

the raw materials may first be prepared by sorting out those that are damaged, followed by cracking, grinding before being pressed and/or extracted with non-toxic solvents like hexane. The crude oil obtained can then be further processed as illustrated above.

In the next two issues, we will cover the role of fats and oils in food quality, safety, nutrition and health.



食物事故點滴  
Food Incident Highlight

吃昆蟲安全嗎？

上月有媒體報道市面上出現一些令人矚目的新穎食物——加入了昆蟲的糖果。食物安全中心早前為此在[食物安全專頁](#)講述了一些有關食用昆蟲的食物安全問題。

在香港很少有人吃昆蟲，但對一些地區的人們來說昆蟲是很好的食物來源，能提供優質蛋白質和其他營養成分。[聯合國糧食和農業組織](#)指出，全球估計有6百萬至1千萬種昆蟲，而據文獻記載有1900種是可以食用的。有證據顯示有人曾因進食昆蟲而引起過敏，但沒有因食用昆蟲而引致嚴重健康問題的個案。

業界應確保所出售或進口的食品適宜供人食用，並符合本港法例標準。加工和貯存昆蟲及其產品時，應採取與其他傳統食物一樣的健康和衛生措施，包括去除昆蟲有潛在危害的部分。市民則應保持均衡和多元化的飲食。

Are Insects Safe to Eat?

Last month, the media reported some exotic foods, insects added in candies, which raised the eyebrows of many people. The Centre for Food Safety (CFS) has addressed some food safety concerns on edible insects in a [Food Safety Topic](#) article.

Although insect eating is an uncommon practice in Hong Kong, insects can be a source of food for people in some places of the world because they provide high-quality protein and other nutrients. According to the [Food and Agriculture Organization of the United Nations](#), out of an estimated 6-10 million species of insects, 1 900 are documented in literature as edible. No significant health problems have arisen from consuming edible insects, though evidence of allergies induced through the ingestion of insects exists.

The CFS reminds the trade to ensure that the foods they sell are fit for human consumption and comply with local legislations. The processing and storage of insects and their products should follow the [same health and sanitation recommendations](#) as for other traditional foods. These include removing the potential harmful parts of the insects. The CFS reminds consumers to maintain a balanced and varied diet.

全面禁止台灣食油進口及在香港出售的指令  
仍然有效

最近有食物商從台灣進口供人食用的芝麻油，此舉違反全面禁止所有台灣生產的食油進口及在香港出售的指令。涉事進口商已遵從食物安全中心(中心)的指示，停售及從其零售點回收該批產品，並將所有餘貨單獨存放。

台灣當局於二零一四年九月首次公布劣質豬油事件，其後發現有部分受影響產品已進口本港並被若干食肆採用。業界應注意，去年中心因應台灣劣質豬油事件而採取的預防性措施至今仍然有效。

Total Ban on the Import and Sale of Edible Oil from Taiwan Still in Force

Recently, some sesame oils from Taiwan were found imported into Hong Kong for human consumption. This has violated the directive on a total ban on the import into and sale within Hong Kong of all edible oil produced in Taiwan. Following the instruction from the Centre for Food Safety (CFS), the importer concerned has stopped the sale and recalled the affected products from its retail outlets, and isolated the remaining stock.

The [substandard lard incident](#) in Taiwan was first reported by Taiwanese authorities in September 2014. Later, it was found that some of the affected products had been imported into Hong Kong and used by certain food premises. The CFS reminds the trade that the preventive measures taken in response to the substandard lard incident in Taiwan last year are still in force.

風險傳達  
工作一覽  
Summary of  
Risk Communication Work

風險傳達工作一覽 (二零一五年八月) Summary of Risk Communication Work (August 2015)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	112
公眾查詢 Public Enquiries	114
業界查詢 Trade Enquiries	249
食物投訴 Food Complaints	408
給業界的快速警報 Rapid Alerts to Trade	15
給消費者的食物警報 Food Alerts to Consumers	7
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	63
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	52