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## 焦點個案 Incident in Focus

## 雪卡毒魚類中毒

## Ciguatera Fish Poisoning

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,

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衛生防護中心最近調查兩宗在今年九月發生的懷疑雪卡毒魚類中毒事故，受影響人數共十人。他們在進食老虎斑這種珊瑚魚後出現雪卡毒魚類中毒症狀，全部無須住院。本文旨在探討雪卡毒魚類中毒及其影響與預防方法。

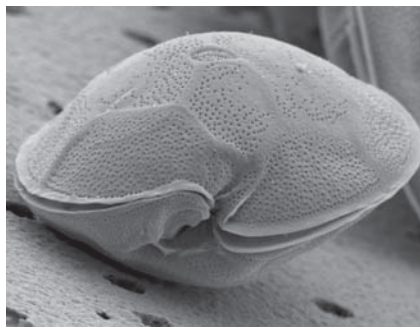
### 何謂雪卡毒魚類中毒及雪卡毒素？

根據紀錄，雪卡毒魚類中毒最早出現於一五一年西印度羣島。雪卡毒魚類中毒是多個水域(包括熱帶及亞熱帶太平洋一帶)的風土疾病，在本港出售的活珊瑚魚有不少是來自這些水域。雪卡毒魚類中毒是由進食含雪卡毒素的珊瑚魚所致。居於珊瑚礁的食草魚類首先吃下有毒的海洋浮游生物，然後體型較大的食肉魚類吃下這些含有毒素的魚類，毒素於是在食物鏈中不斷累積。

雪卡毒素是一組耐熱的脂溶性化合物，由干比亞藻這種海洋浮游生物產生。干比亞藻生活在北緯32度至南緯32度之間的水域，而含雪卡毒素的魚類只會在一帶內的水域出沒。受影響魚類的內臟、肝臟及生殖器的毒素含量較其他部位高50至100倍，但有關魚類仍然毫無症狀。由於雪卡毒素非常耐熱，不能透過烹煮及加工過程消除，故可影響進食含雪卡毒素魚類的人的神經和肌肉功能。由於國際海產貿易不斷增加，雪卡毒魚類中毒現時是全球常見的一種海產中毒。

### 對人體的影響

雪卡毒魚類中毒第一個症狀可在30分鐘內迅速出現，但通常在進食可引致中毒的魚類後24至48小時才出現。患者最初會出現腸胃或神經系統不適。嘔吐、腹瀉、噁心及腹痛等腸胃不適一般只會持續數天，而口部及四肢刺痛、皮膚發癢、溫度認知有變、疲倦、肌肉及關節



這種干比亞藻可產生雪卡毒素(由美國華盛頓史密森尼博物館轄下國立自然歷史博物館植物學系 Maria A. Faust博士拍攝的照片)

Marine plankton *Gambierdiscus toxicus* can produce ciguatera toxins (Image taken by Dr. Maria A. Faust, Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A.)

The Centre for Health Protection (CHP) recently investigated two suspected ciguatera fish poisoning (CFP) outbreaks affecting a total of ten persons in September 2010. They developed symptoms of CFP after consumption of tiger grouper, a type of coral reef fish. None of them required hospitalisation. This article discusses what CFP is and its effect and prevention.

### What are Ciguatera Fish Poisoning and Ciguatoxins?

CFP was first recorded in 1511 in the West Indies. CFP is endemic in many areas, including tropical and subtropical Pacific, where many of the locally-sold live coral reef fish are sourced. It is caused by the consumption of coral reef fish that contain ciguatoxins. The toxins accumulate up the food chain which starts with the herbivorous fish that graze on toxic marine planktons in the coral reef and accumulate successively in the body of larger carnivorous fish.

Ciguatoxins are a group of heat-stable, fat-soluble compounds. They are produced by marine plankton *Gambierdiscus toxicus*. The plankton live in the oceans between 32°N and 32°S and ciguatera fish are confined to patches of oceans in the area. The toxins are up to 50 - 100 times more concentrated in the viscera, liver and gonads of affected fish, while the fish remain asymptomatic. As the toxins are heat-stable and cannot be removed by cooking or processing, they can affect the nerve and muscle functions of persons who consume ciguatera fish. CFP is now a common type of marine food poisoning worldwide, due to increased international commerce in seafood.

### Effects on Humans

The first symptoms can appear as quickly as 30 minutes, while a delay of 24 to 48 hours after consumption of CFP fish is common. The initial symptoms can be gastrointestinal or neurological. The gastrointestinal symptoms like vomiting, diarrhoea, nausea and abdominal pain usually last only a few days, the neurological symptoms like tingling of lips, hands and feet, skin itching, change in temperature perception, fatigue, muscle and joint pain appear later and last longer, sometimes up to a few years. In severe cases, low blood pressure, slow heart rate, respiratory difficulties and paralysis are possible, but death is uncommon.

焦點個案  
Incident in Focus

疼痛等神經系統不適會隨後出現，並持續較長時間，有時會長達數年。情況嚴重者可能出現低血壓、心搏過緩、呼吸困難及停頓，但死亡個案則少見。

其他因素，例如以往曾否出現雪卡毒魚類中毒、有否飲用酒精飲料和食用花生或豆類食物，亦會令個別人士較易出現雪卡毒魚類中毒。

### 本港情況

食物安全中心在接獲雪卡毒魚類中毒個案的通報後，會調查有關處所和供應商，以確定問題魚類的品種和來源。調查和監察工作會有一定程度困難，因為食物殘渣往往已不存在，加上現時業界的登記和備存食物紀錄工作純屬自願性質，故可供追查食物來源的紀錄並不齊備。根據衛生防護中心的紀錄，本港在二零零七至零九年共有32宗確診雪卡毒魚類中毒個案，受影響人數為102人。食物安全中心的調查顯示，在涉及雪卡毒魚類中毒的各種魚類中，以西星斑、燕尾星斑、老虎斑及東星斑較常見，其他品種包括青斑、蘇眉、紅鰭、油鯪等。此外，食物安全中心與業界的調查發現，最常受雪卡毒素影響的捕魚區有南沙羣島、吉里巴斯及海南島，涉及的魚類通常介乎0.6 - 3公斤（1 - 5斤），但據報亦有在此重量範圍以外的魚類。由於食物安全中心不能核實有關資料，故有關魚類品種和來源資料可能未夠全面。

《食物安全條例草案》通過後，食物商須備存有關交易紀錄（獲取紀錄、供應紀錄或捕撈紀錄（視乎情況而定））。因此，我們預計日後可較準確取得魚類品種和來源資料。

為保障市民健康，食物安全中心發出《為預防和控制雪卡毒事故的進口和售賣供人食用的活海魚作業守則》，當中列明在進口和售賣供人食用的活海魚時的基本要求，以確保食物安全。此外，食物安全中心會在每宗近期發生的雪卡毒魚類中毒事故後向業界發出勸諭信和通訊，提供有關魚類來源的資料（如可得到的話）。

#### 注意要點：

1. 雪卡毒魚類中毒是由吃下珊瑚魚體內雪卡毒素所致，烹煮及加工過程均不能消除這種毒素。
2. 進食珊瑚魚時，應避免吃花生或豆類食物和喝酒。
3. 向安全來源採購珊瑚魚。

#### 給消費者的建議

- 減少進食珊瑚魚，避免進食珊瑚魚的卵、肝、腸、頭和皮。
- 進食珊瑚魚時，應避免吃花生或豆類食物和喝酒。
- 向信譽良好的零售商購買珊瑚魚。
- 如出現雪卡毒魚類中毒病徵，應立即求醫。

#### 給業界的建議

- 遵從上文提到有關進口和售賣供人食用活海魚的《作業守則》內的要求。
- 避免從已知近期有含雪卡毒素魚類的水域採購魚類。

#### 更多資料

- 中心擬備的“進食珊瑚魚慎防雪卡毒”單張

Factors like previous CFP intoxication, the consumption of alcoholic beverages, nuts and seed products can also increase the sensitivity of an individual against CFP intoxication.

### Local Situation

When there are notifications of CFP cases, the Centre for Food Safety (CFS) will investigate the relevant premises and suppliers in order to ascertain the species and source of implicated fish. Investigations and surveillance are difficult because food remnants are often unavailable, and traceability records are incomplete as the registration and record-keeping is currently voluntary. According to CHP, there are 32 confirmed cases of CFP affecting 102 persons between 2007 and 2009. CFS investigations showed that of all the species implicated in CFP, the most frequent were squaretail coral grouper, lyretail, brown marbled (tiger) grouper and leopard coral grouper; the other species involved were orange spotted grouper, humphead wrasse, two-spot red snapper, moray eel, etc. CFS investigations with the trade also suggested that the most frequently contaminated fishing grounds were Nansha Island, Kiribati and Hainan Island. Size of fish involved usually ranged from 0.6 - 3 kg (1 - 5 catties), but fish outside this weight range had also been reported. The above information on species and source of fish may be biased as the information could not be verified.

Upon enactment of the Food Safety Bill, food traders will be required to keep relevant transaction records (acquisition records, supply records or capture records as appropriate). Therefore, it is envisaged that data collected in the future would be able to provide more accurate information on fish species and their sources.

To protect public health, the CFS has issued a [Code of Practice on Import and Sale of Live Marine Fish for Human Consumption for Prevention and Control of Ciguatera Fish Poisoning](#) which contains the minimum requirements in importing and selling live marine fish for human consumption to ensure food safety. CFS also issues advisory letters and newsletter to the traders after each recent CFP incident, providing information on fish source if available.

#### Key Points to Note:

1. CFP is caused by ingestion of ciguatoxins in coral reef fish; cooking and processing cannot destroy the toxins.
2. Avoid nuts, beans and alcohols when consuming coral reef fish.
3. Coral reef fish should be sourced from safe sources.

#### Advice to Consumers

- Eat less coral reef fish and avoid eating the roe, liver, guts, head and skin.
- Avoid nut or seed products and alcoholic beverages when consuming coral reef fish.
- Buy fish from reliable seafood retailers.
- Seek immediate medical advice if one has CFP symptoms.

#### Advice to the Trade

- Comply with the requirements of [Code of Practice](#) in the above for the import and sale of live marine fish for human consumption.
- Avoid sourcing fish from areas that are known to produce ciguatoxic fish recently.

#### More Information

- CFS pamphlet [Mind Ciguatera Fish Poisoning](#)



# 食物與防腐劑的巧妙配搭

## Matchmaking of Food and Preservatives

食物安全中心  
風險評估組  
科學主任馬嘉明女士報告

Reported by Ms. Janny MA, Scientific Officer,  
Risk Assessment Section,  
Centre for Food Safety

我們吃的食物絕少是無菌的。食物中的營養吸引細菌、酵母菌及霉菌等多種微生物生長。不過，微生物就像我們一樣，各有不同的食物喜好。

### 微生物喜愛的食物

微生物比我們更加挑食！牠們各有自己喜歡與不喜歡的食物，舉例來說，酵母菌及霉菌喜歡汽水等高酸性的食物，但大部分細菌則不然；同樣，霉菌愛水分含量偏低的麵包，但其他微生物則不然。沒有微生物會愛吃經過加熱處理後貯存在無氧環境下的罐頭肉類等食物，但是可產生孢子的厭氧菌卻偏偏例外。食物的化學與物理特性和加工處理與貯存方法會決定哪一種微生物可在當中生長。

雖然不是所有微生物都會引致食物腐壞或食源性疾病，但大抵沒有人會想與微生物分享美食吧？為使微生物不會在食物中生長，我們的祖先開始反復嘗試各種方法，包括在食物中加入不同的化學物。防腐劑的運用正是這些古老方法的延續。

### 防腐劑的運用

正如醫生為病人處方藥物一樣，食物製造商會根據他們對防腐劑抗菌譜的認識、食物和防腐劑的性質，以及食物的貯存和處理方式，從一系列選擇中選用適合的防腐劑，以趕絕最愛吃有關食品的微生物。

### 一些常見防腐劑的特點

#### 霉菌及酵母菌殺手 — 苯甲酸和其衍生物及山梨酸

苯甲酸及山梨酸天然存在於部分醬果，但在食物中應用的苯甲酸及山梨酸則是人工合成的。兩者均能有效抑制酸性食物中的酵母菌及霉菌，而酸性食物本身不利部分細菌生長。因此，大家在汽水等酸性食物的標籤上可輕易找到苯甲酸及／或山梨酸這些防腐劑。

對羥基苯甲酸酯類(例如對羥基苯甲酸甲酯)與苯甲酸不同，可在不同的酸鹼值環境中用來抑制酵母菌及霉菌，因此苯甲酸衍生物除了可用於辣椒醬等酸性食物外，還可用於蝦醬等酸鹼值接近中性的食物。

#### 霉菌狙擊手 — 丙酸

丙酸天然存在於多種植物和一些芝士中。丙酸的抗菌作用主要針對霉菌，對麵包糕點業十分重要。剛從焗爐取出來的麵包通常不會有微生物，但卻會成為由空氣中孢子發芽而成的霉菌的美食。為防止存放在室溫環境中的麵包長出毛茸茸的黑點，麵包經常會加入丙酸抑制霉菌生長。

#### 肉毒桿菌死敵 — 硝酸鹽及亞硝酸鹽

硝酸鹽天然存在於環境四周及植物，可經細菌或酶作用轉化為亞硝酸鹽。人工硝酸鹽和亞硝酸鹽可用作防腐劑抑制多種細菌，當中最重要用途是能夠抑制可產生孢子的細菌，包括肉毒桿菌，這類細菌可抵受

The foods that we eat are rarely sterile. Their nutritious nature attracts ranges of microorganisms including bacteria, yeasts and moulds to grow on. However, just like us, each type of microorganisms has their own food preference.

### Microorganisms' Favourite Food

Microorganisms are pickier than we do! Each type of microorganisms has their likes and dislikes. For instance, foods with high acid content e.g. soft drinks are welcomed by yeasts and moulds but not most bacteria. Similarly, moulds love breads with relatively low moisture content but not other microorganisms. No microorganisms would like to have a taste on those heat treated foods stored under oxygen free environment e.g. canned meat except those spore-forming anaerobic bacteria! The chemical and physical properties of the foods as well as their processing and storage determine what types of microorganisms are able to grow on.

Even though not all microorganisms cause food spoilage or foodborne diseases, probably no one would like to share our tasty food with microorganisms. To get microorganisms out of our food, our ancestors started using various methods including adding ranges of chemicals to foods by trial and error. The use of preservatives is considered as a continuation of these old practices.

### The Use of Preservatives

Like doctors prescribe medications for us when we are sick, food manufacturers apply specific preservatives from a range of choices, based on their knowledge of the antimicrobial spectrum of preservatives, the nature of food and preservatives as well as the storage and handling conditions of food, to knock out those microorganisms which love their products most.

### Features of Some Common Preservatives

#### *Moulds and Yeasts Fighters - Benzoates and Their Derivatives plus Sorbates*

Both benzoates and sorbates occur naturally in some berries but are prepared synthetically for food use. They inhibit yeasts and moulds effectively in acidic foods, where the growth of some bacteria is not supported. That is the reason why you can easily find benzoates and/or sorbates on food labels as preservatives in sour foods like soft drinks.

Unlike benzoates, their esters e.g. methyl para-hydroxybenzoate can be used over a wide range of pH to inhibit yeasts and moulds. Therefore, benzoate derivatives are not only used in acidic foods such as chilli sauces but also foods with near neutral pH like shrimp paste.

#### *Moulds Inhibitors - Propionates*

Propionates can naturally be found in a number of plants and certain cheeses. Their antimicrobial activity are mostly against moulds and they are of importance in the bakery industry. Just baked bread coming out of the oven is generally free from microorganisms, however, it will become a delicious food for moulds germinated from spores in the air. To prevent having furry black dots on breads which are kept at room temperature, propionates are often added to inhibit mould growth.

#### *Clostridium botulinum's Enemies - Nitrates and Nitrites*

Nitrates occur naturally in the environment and plants and can be converted to nitrites by bacteria or enzyme actions. Synthetic nitrates and nitrites can be used as preservatives which can inhibit a range of bacteria. Of most practical importance is their ability to inhibit spore-forming bacteria



發霉麵包 Mouldy bread

在多種醃製肉類製作過程中採用的加熱程序。肉毒桿菌能產生可引致肉毒中毒的毒素，肉毒中毒是一種罕見但嚴重的疾病。

### 細讀標籤查看防腐劑

《食物及藥物(成分組合及標籤)規例》規定，如預先包裝食物加入了食物添加劑，應在配料表上列明其名稱或識別編號及作用類別(例如防腐劑)。

消費者可參考食物安全中心出版的《食物添加劑消費者指南》，就能知道以識別編號標示的食物添加劑。

我們在下一期會探討特別受關注的防腐劑。

including *Clostridium botulinum* which can survive heat processing applied to many cured meats. *Clostridium botulinum* can produce toxins which can cause a rare but serious illness called botulism.

### Read Label to Find Preservatives

As required by the Food and Drugs (Composition and Labelling) Regulations, the name or identification number of the food additive together with its functional class e.g., preservative should be labelled in the ingredient list if it has been added to prepackaged food.

Consumers can identify the food additives labelled with its identification number by making reference to the [Consumer Guide to Food Additives](#) published by the CFS.

In the next issue, let's move on to take a look at preservatives which are of special concern.

## 食物事故點滴 Food Incident Highlight

### 新鮮牛肉中的二氧化硫

食物安全中心(中心)就肉類中的二氧化硫進行第二期專項食品調查，發現179個經檢測的肉類樣本中有9個新鮮牛肉驗出含有禁用的二氧化硫。在本港，二氧化硫不得用於新鮮、冷凍和冷藏肉類中以保存鮮肉的顏色，因為此舉可能構成欺詐。

中心密切監察有關情況，又向有關商販發出警告信和再次抽取樣本。違例者一經定罪，可處以罰款和監禁；屢犯者會遭暫時吊銷或取消牌照。

二氧化硫可令對這種化學物敏感的人出現氣喘、頭痛或噁心等過敏反應。消費者切勿購買顏色異常鮮紅的肉類。

### Sulphur Dioxide in Fresh Beef

The second phase of the targeted food surveillance project on sulphur dioxide in meat conducted by the Centre for Food Safety (CFS) revealed that 9 fresh beef out of 179 meat samples tested were found containing non-permitted sulphur dioxide. The application of sulphur dioxide in fresh, chilled and frozen meat for retaining the desirable fresh meat colour is not permitted in Hong Kong due to possible deception caused.

The CFS has closely monitored the situation and issued warning letters to the shop operators concerned and collected follow-up samples. Conviction results in fine and imprisonment. For repeated offenders, their license will be suspended or cancelled.

Sulphur dioxide may induce allergic reactions such as asthmatic attacks, headache and nausea in individuals who are sensitive to this chemical. Consumers are advised not to buy meat which is unnaturally red.

### 銀鱈魚及劍魚中的汞

食物安全中心(中心)公布七月份食物安全報告結果，發現冷藏銀鱈魚和冷凍劍魚樣本的汞(俗稱“水銀”)含量超標。中心在取得檢測結果後立即追查有關食物的來源，向有關銀鱈魚商販發出警告信，並銷毀整批由菲律賓進口的劍魚，有關劍魚並無流入市面。中心已通知問題食物原產國的有關當局，並會繼續進行更多檢測。

魚類含有人體成長和發育所需的多種營養素，例如奧米加-3脂肪酸和優質蛋白質。市民應進食多種魚類，保持均衡飲食。由於攝取過量汞可影響發育中的神經系統，孕婦、計劃懷孕的婦女和幼童應避免選吃銀鱈魚和劍魚等體型較大的捕獵魚類，以減低風險。

### Mercury in Black Cod and Swordfish

The Centre for Food Safety (CFS) released the findings of its [Food Safety Report for July](#) which found excessive mercury in frozen black cod and chilled swordfish samples. Immediately after obtaining the results, the CFS conducted source-tracing. Warning letters were issued to the traders of the black cod. The whole consignment of the swordfish, which was imported from the Philippines, was destroyed and did not enter the market. The CFS has informed the relevant authority of the country of origin and continued to conduct further testing.

Fish contains many essential nutrients for growth and development such as omega-3 fatty acids and high quality proteins. The public is advised to consume a variety of fish and maintain a balanced diet. Since excessive intake of mercury can affect the developing nervous system, pregnant women, women planning pregnancy and young children should avoid large predatory fish such as black cod and swordfish to reduce the risk.

## 風險傳達 工作一覽 Summary of Risk Communication Work

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