食物安全焦點
Food Safety Focus

食物安全中心
Centre for Food Safety

二零一七年九月・第一百三十四期
September 2017・134th Issue
ISSN 2224-6908

由食物環境衞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 Incident in Focus

在雞蛋檢出除害劑氟蟲腈
Pesticide Fipronil Detected in Eggs

食物安全中心
風險傳達組科學主任林伏波博士及
風險評估組吳雪兒獸醫報告

Reported by Dr. Violette LIN, Scientific Officer, Risk Communication Section and Dr. Cherrie NG, Veterinary Officer, Risk Assessment Section
Centre for Food Safety

事件

二零一七年八月二日，荷蘭食物及消費品安全局發出通告，指有荷蘭生產的若干雞蛋被檢出除害劑氟蟲腈(亦稱芬普尼)的含量可能對消費者的健康有不良影響。其後，其他地區(例如南韓及台灣)的有關當局亦報稱檢出當地生產的雞蛋含有氟蟲腈。

在歐洲聯盟(歐盟)所發生的事件報稱是由於該化學品在蛋場中被非法使用以對抗雞隻的寄生蟲問題，導致雞蛋及雞肉(由被淘汰的產蛋雞製成的肉類)被檢出氟蟲腈。

本文將探討氟蟲腈的使用及其對人類健康造成的潛在影響、本地法例對雞蛋中的氟蟲腈含量的監管，以及食物安全中心(中心)為保障公眾健康而對是次事件所採取的行動。

氟蟲腈及其對人類健康造成的不良影響

氟蟲腈是一種廣譜除蟲劑及除螨劑，可控制農作物中的食葉害蟲、土壤害蟲及蛀心蟲，亦可對抗伴侶動物(例如狗和貓)的體外寄生蟲。然而，於發生該宗事件的歐盟不准在食用動物使用氟蟲腈。

若大量攝取氟蟲腈，或會引致腎臟、肝臟及甲狀腺受損。根據現有的科學資料，氟蟲腈並沒有被界定為會引致基因突變或致癌，亦沒有對生殖能力或胎兒造成已知的影響。

本地法例對雞蛋中的氟蟲腈含量的監管

在香港，雞蛋中的氟蟲腈含量受《食物內除害劑殘餘規例》(第132CM章)所規管。雞蛋中的氟蟲腈的最高殘餘限量為百萬分

圖1：抽取進口雞蛋樣本作檢查及化學(包括氟蟲腈)檢測。
Figure 1: Samples of imported eggs are inspected and tested for chemicals including fipronil.

The Incident

On 2 August 2017, the Netherlands Food and Consumer Product Safety Authority (NFCPSA) issued a notice that certain eggs produced in the Netherlands were detected as containing fipronil, a pesticide, at levels which might cause adverse health effects to consumers. Subsequently, other authorities such as those in South Korea and Taiwan also reported fipronil detected in their locally produced eggs.

The incident in the European Union (EU) was reported to be caused by illegal use of the chemical on egg farms to combat parasites in chickens. This illegal activity has resulted in fipronil being detected in eggs and chicken meat (meat from laying hens to be replaced).

This article discusses the use of fipronil and its potential health effects to humans, the local regulatory control of fipronil in eggs, and the actions taken by the Centre for Food Safety (CFS) on this incident in protecting public health.

Fipronil and Its Adverse Health Effects to Humans

Fipronil is a broad-spectrum insecticide and acaricide. It can control leaf-feeding pests, soil pests and borers in crops and combat external parasites in companion animals, such as dogs and cats. However, fipronil is not allowed to be used on food producing animals in the EU where this incident arose.

Fipronil, if consumed in large quantities, may damage the kidneys, liver and thyroid gland. According to current scientific knowledge, fipronil is not classified as mutagenic or carcinogenic, and has no known harmful effects on reproduction or unborn.

Local Regulatory Control of Fipronil in Eggs

In Hong Kong, fipronil in eggs is regulated under the Pesticide Residues in Food Regulation (Cap. 132CM). The maximum residue level of fipronil in eggs is 0.02ppm, a level which is consistent with the corresponding standard specified by the Codex Alimentarius Commission.

Under the CFS Food Surveillance

焦點個案 Incident in Focus

之零點零二。此標準與食品法典委員會的相關標準一致。

中心透過食物監察計劃，從進口、批發及零售層面抽取雞蛋樣本作化學及微生物測試，以確保雞蛋符合法例規定和適宜供人食用(圖1)。

有關使用化學品的良好養殖規範

對於動物製食品，食物安全由生產食物的農場層面開始。世界動物衞生組織及聯合國糧食及農業組織發出良好養殖規範指南(Guide to Good Farming Practices)，就這方面的問題提供建議。該指南建議，農民或管理人應知悉和遵守當地法規就在禽畜及農場環境使用化學品(例如獸藥及生物製劑)所訂的限制。使用這些物質時須非常謹慎，並按照製造商的指示或獸醫處方使用。這些化學品的使用記錄應予以保存。

在香港，飼養家禽以生產肉類或蛋類供人類食用須申領牌照，並受漁農自然護理署負責執行的《公眾衞生(動物及禽鳥)(禽畜飼養的發牌)規例》(第139L章)所規管。發牌條件訂明多項農場管理及管制事宜。

所採取的行動

在二零一四年至二零一七年七月期間，中心共抽取了約1 290個禽蛋樣本作化學(包括氟蟲腈)檢測，結果令人滿意。儘管如此，在收到荷蘭食物及消費品安全局的通告後，中心扣檢據報有使用氟蟲腈的從歐盟成員國(包括荷蘭及比利時)進口的雞蛋樣本。截至八月三十一日，中心共抽取76個由歐盟成員國進口的雞蛋及蛋類製品樣本作檢測，結果顯示有八個樣本的氟蟲腈含量超出本港法例標準。不過，根據中心所檢測的雞蛋樣本的除害劑含量，進食一般分量的雞蛋預計不會對健康造成不良影響。

因應事件，中心已加強在進口層面扣檢來自歐盟成員國家的禽蛋和蛋類監察工作。中心一直就事件與海外有關當局，包括歐盟委員會有關當局保持聯繫，並會繼續採取適當的跟進行動。事件的最新進展資料載於中心的臉書(Facebook) 及中心的網頁。

注意要點：

1. 氟蟲腈是一種用作控制害蟲的廣譜除蟲劑及除螨劑，但不建議用於食用動物。
2. 中心已在進口層面加強管制雞蛋及蛋類製品的措施。
3. 食物中的氟蟲腈受香港法例第132CM章所規管。

給業界的意見

- 確保出售的食物適合供人食用。
- 嚴格遵守本地規例，包括第132CM章。
- 從可靠來源採購雞蛋及蛋類製品。

給市民的意見

- 保持均衡飲食，避免因偏食幾類食品而攝入過量食物化學品。
- 繼續瀏覽中心的網站及臉書(Facebook)，了解事件的進展。

Programme, egg samples are collected at import, wholesale and retail levels for chemical and microbiological testings to ensure that they meet legal requirements and are fit for human consumption (Figure 1).

Good Farming Practices with regard to Use of Chemicals

For foods of animal origin, food safety starts at the farm level, where the food is produced. The Guide to Good Farming Practices issued by the World Organisation for Animal Health and the Food and Agriculture Organization of the United Nations provides recommendations in this regard. The Guide recommends that farmers or managers should be aware of and comply with restrictions in the local regulations on usage of chemicals such as veterinary medicines and biologicals in livestock and the farm environment. These substances should be used judiciously and according to the manufacturer's instructions or veterinary prescription for veterinary medicine. Records of use of these chemicals should be kept.

In Hong Kong, keeping of poultry for producing meat or eggs for human consumption requires a licence and is regulated under the Public Health (Animals and Birds) (Licensing of Livestock Keeping) Regulation (Cap. 139L) enforced by the Agriculture, Fisheries and Conservation Department. Various aspects of farm management and control are specified in the licensing conditions.

Actions Taken

From 2014 to July 2017, the CFS has collected a total of about 1 290 poultry egg samples for chemical (including fipronil) testing and results were satisfactory. Nevertheless, upon receiving the notice from NFCPSA, among others, the CFS held and tested eggs imported from the EU member states including the Netherlands and Belgium where use of fipronil had been reported. As of 31 August 2017, out of 76 samples of eggs and egg products from EU members states collected for fipronil testing, eight were found exceeding the local legal limit. However, based on the levels of the pesticide detected in the egg samples tested by the CFS, adverse health effect is not expected under usual consumption.

In response to the incident, the CFS has stepped up holding and testing of poultry eggs from EU member states at import level and enhanced surveillance on eggs. The CFS has maintained liaison with the relevant overseas authorities including authorities in the European Commission and will continue to take appropriate follow-up action. Information on the updates of the incident is available in the CFS Facebook and CFS webpage.

Key Points to Note:

1. Fipronil, a broad-spectrum insecticide and acaricide used to control pests, is not recommended to be used on food producing animals.
2. At import level, the CFS has stepped up control measures on eggs and egg products.
3. Fipronil in foods is regulated under Cap. 132CM.

Advice to the Trade

- Ensure food sold is fit for human consumption.
- Adhere strictly to the local regulations, including Cap. 132CM.
- Obtain eggs and egg products from reliable sources.

Advice to the Public

- Take a balanced diet so as to avoid excessive intake of food chemicals from a small range of food items.
- Follow the CFS website and Facebook for the developments of the incident.

食物安全平台
Food Safety Platform

食用菌中的金屬污染物
Metallic Contaminants in Edible Fungi

食物安全中心
風險評估組
研究主任黎礎程女士報告

Reported by Ms. Constance LAI, Research Officer,
Risk Assessment Section,
Centre for Food Safety

這是最後一篇以食物中金屬污染物為題的系列文章。本文將集中探討一種特定食物 -- 食用菌所含的金屬污染物。

什麼是食用菌?

食用菌普遍是指一種特定植物羣體的子實體 -- 野生或栽培作食物用途的真菌。食用菌有悠久的食用歷史。在國際市場上，已知有超過1 000個品種的真菌可作食物用途。

食用菌中的金屬污染物

金屬是地殼表面的天然成分，普遍存在於環境中。與其他植物相比，真菌具備更有效的機制從基質吸取微量元素，包括金屬污染物。金屬污染物主要是透過真菌大量分支的綫狀菌絲(菌絲體)從基質積聚在子實體(圖2)。金屬污染物可產生有害的影響，干擾真菌的生物過程。有研究人員指出，真菌具有多種的抗逆性機制，以增強對金屬污染物的耐受性。普遍認為，真菌會產生一些抗逆性物質與金屬離子結合，並將其貯存於液泡中，從而減低金屬污染物的毒性和增強真菌的耐受性。

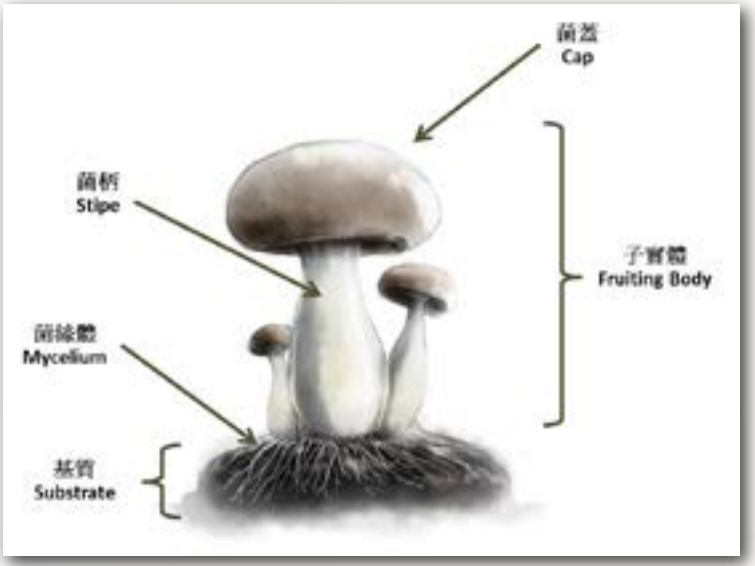

圖2:典型真菌的結構。
Figure 2: Structure of a typical fungus.

真菌的金屬污染物含量因品種而異，不同品種真菌的金屬污染物含量可以差別很大。一般而言，鎘、汞、砷及鉛是食用菌中常見的金屬污染物。鑑於食用菌可天然地積聚鎘，並容易吸收鎘，故不時有報告指食用菌的鎘含量超標。有報告指出，多種食用菌可積聚較高濃度的鎘。

栽培與野生食用菌的分別

栽培食用菌差不多有100個品種，但國際市場主要由數個品種所佔用。蘑菇(雙孢蘑菇)、香菇／花菇／冬菇(香菇)及蠔菇／平菇(側耳屬)(圖3)佔世界各地的栽培食用菌接近四分之三。很多國家生產栽培食用菌的技術成熟，栽培食用菌的產量甚高。然而，部分品種(例如松茸及雞油菌)有複雜的生

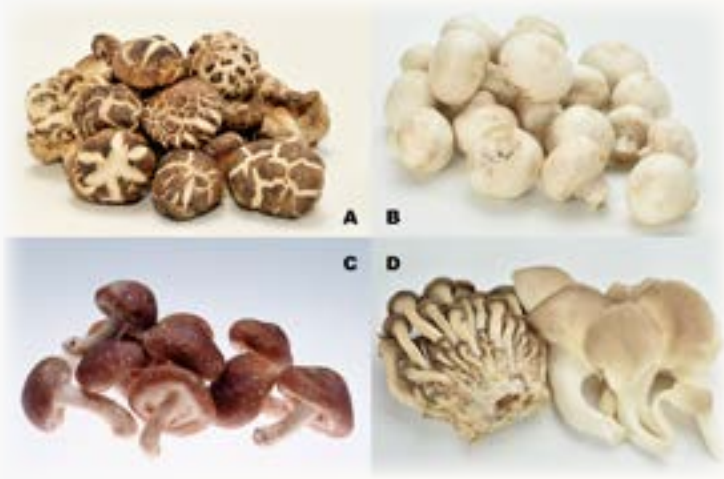

圖3:國際市場上常見的栽培食用菌(A:乾香菇／乾花菇／乾冬菇; B:蘑菇; C:鮮香菇／鮮花菇／鮮冬菇; D:蠔菇／平菇)。
Figure 3: Cultivated edible fungi (A: Dried shiitake mushrooms; B: Common/ Button mushrooms; C: Fresh shiitake mushrooms; D: Oyster mushrooms) are readily available in the local market.

This is the final of a series of articles on metallic contaminants in food. Let's take this opportunity to focus on metallic contaminants in a specific commodity – edible fungi.

What Are Edible Fungi?

Edible fungi are generally recognised as the fruiting bodies of a specific plant group – fungi which either grow wild or are cultivated for food use. They have a long history of consumption as food. In the global market, over a thousand of edible and food fungi species have been recorded.

Metallic Contaminants in Edible Fungi

Metals are natural components of the earth's crust and ubiquitous in the environment. Comparing with other plants, fungi possess a more effective mechanism that enables them to take up trace elements, including metallic contaminants, in substrate. Metallic contaminants can be accumulated to the fruiting bodies from substrate mainly through the extensively branching, thread-like hyphae (mycelium) (Figure 2). Metallic contaminants can impose harmful effects and disrupt the biological processes of fungi. To tolerate the metallic contaminants, various stress tolerance mechanisms in fungi have been reported by researchers. It is commonly believed that fungi produce some stress substances to bind with the metal ions and store the resulting complex in vacuoles, reducing the toxicity of metallic contaminants and improving the tolerance of fungi.

The levels of metallic contaminants in fungi are species-specific and can vary a lot among different fungi species. Generally speaking, cadmium, mercury, arsenic and lead are the common metallic contaminants found in edible fungi. Excess levels of cadmium in edible fungi were reported from time to time as edible fungi are the natural accumulators of cadmium and can readily take up cadmium. A number of edible fungi species have been reported to accumulate cadmium at higher concentrations.

Cultivated VS Wild Edible Fungi

There are nearly a hundred species of edible fungi that can be cultivated; global markets are dominated by a few. Common/ Button mushrooms (*Agaricus bisporus*), shiitake mushrooms (*Lentinula edodes*) and oyster mushrooms (*Pleurotus* spp.) (Figure 3) accounted for nearly three quarters of the cultivated edible fungi grown around the world. Their cultivation technologies are well established and cultivated edible fungi have been produced in large

命周期，並需要與活植物或樹木的根部一同生長，故必須是野生採摘。若要成功栽培這些食用菌，便需進一步發展有關技術。

與野生食用菌比較，栽培食用菌所積聚的金屬污染物含量通常較低。多項研究顯示，食用菌的金屬污染物含量視乎環境的污染程度及其生命周期而定。栽培食用菌的生長環境通常較佳，並受妥善監控，基質含有金屬污染物的機會亦較小。栽培食用菌通常只須較短時間栽培便可採摘，栽培時間由數星期至數月不等；而野生食用菌的生長時間可能長達數年。因此，野生真菌有較大機會積聚更多金屬污染物。

減低風險……

切勿採摘野生真菌進食。在不受監控的開放環境(例如道路、熔爐及工業地區附近)下生長的野生真菌通常積聚更多金屬污染物。此外，一些不可食用的野生有毒真菌與野生食用菌在外形上非常相似，而且兩者可能生長在同一環境。市民應注意進食野生真菌的風險。市民亦應保持均衡及多元化的飲食，避免因偏食幾類食品(例如食用菌)而攝入過量金屬污染物。

quantities in many countries. However, some species, such as matsutakes and chanterelles, have complex life cycles and need to grow with the roots of a living plant or tree. They have to be harvested from the wild. Further development of technology is needed to cultivate these edible fungi successfully.

Cultivated edible fungi usually accumulate lower levels of metallic contaminants than wild species. Various studies have shown that the level of metallic contaminants in edible fungi depends on the level of contaminants in the environment as well as their life span. The growing environment of cultivated edible fungi is more optimised and well-controlled, and substrates are less likely to contain metallic contaminants. Cultivated edible fungi usually can be harvested in a shorter period of time, ranging from weeks to several months while wild edible fungi may take several years to grow. Hence, wild fungi are more likely to accumulate higher levels of metallic contaminants.

To Reduce Risk...

Do not pick wild fungi for consumption. Wild fungi usually accumulate higher levels of metallic contaminants in uncontrolled open environment, especially near roads, smelters and industrial areas. Besides, wild inedible, poisonous fungi may look very similar to wild edible fungi and may grow in the same habitat. The public should be aware of the risk in consuming wild fungi. The public is also advised to maintain a balanced and varied diet so as to avoid excessive exposure to metallic contaminants from a small range of food items.

食物事故點滴
Food Incident Highlight

肉類呈神秘的金屬色

食物安全中心不時收到投訴，指肉類(例如禽肉)的切面呈現有光澤的金屬色。部分市民或會憂慮肉類呈現該等詭異的彩虹色的食物安全問題。

肉類產生彩虹色為物理現象，會導致生及熟的肉類製品(例如燒牛肉片及火腿製品)呈現有光澤的彩虹色彩(例如綠色、紅色、橙色)。肉類含有鐵質、脂肪及其他化合物。普遍認為，肉類產生彩虹色的物理過程涉及肌肉的橫紋結構及纖維特性所產生的衍射作用。當光線照射在一片肉類的表面時，便會如彩虹般分裂成多種顏色。肉類化合物所含的多種色素，經加熱及加工處理，可產生帶彩虹光或綠光的色彩。根據海外的食物安全監管機構，肉類呈彩虹色並不表示肉質變差或有安全問題。

Mysterious Metallic Colours on Meat

From time to time, the Centre for Food Safety received complaints about the presence of shiny metallic colours on the cut surface of meat such as poultry meat. Some members of the public may have concerns about food safety regarding these mysterious iridescent colours on meat.

Iridescence is a physical phenomenon that results in shiny, rainbow-like colours (e.g. green, red, orange) seen in raw and cooked meat products, e.g. sliced roast beef and ham products. Meat contains iron, fat, and other compounds. The commonly accepted mechanism for iridescence involves optical light diffraction resulting from muscle's striated structure and fibrous nature. When light hits a slice of meat, it splits into colours like a rainbow. There are various pigments in meat compounds that can give it an iridescent or greenish cast when exposed to heat and processing. According to overseas food safety authorities, iridescence does not represent decreased quality or safety of the meat.

急凍水牛肉被驗出含氯霉素

上月，食物安全中心(中心)接獲澳門有關當局通知，指一批從香港進口的急凍水牛肉被驗出含禁用獸藥氯霉素。因應澳門的檢測結果，中心隨即調查個案，發現有關水牛肉是從第三國進口。中心呼籲市民不要食用受影響批次的產品，業界亦應停止使用或出售有關產品。中心並已就事件知會原產國家的有關當局。

根據《食物內有害物質規例》(第132AF章)，在本港出售供人食用的肉類不可含有氯霉素，違例者會被檢控，一經定罪，可處罰款50,000元及監禁六個月。

Chloramphenicol Found in Frozen Buffalo Meat

Last month, the Centre for Food Safety (CFS) received notification from Macau authorities that a batch of frozen buffalo meat imported from Hong Kong was found to contain a non-permitted veterinary drug, chloramphenicol. In view of Macau's findings, the CFS has immediately investigated the case and noticed that the buffalo meat was imported from a third country. The CFS urged the public not to consume the affected batch of the product and the trade to stop using or selling the product. The CFS has also informed the authorities of the country of origin.

According to the Harmful Substances in Food Regulations (Cap. 132AF), no meat sold in Hong Kong for human consumption is allowed to contain chloramphenicol. Offenders will be prosecuted and will be liable to a fine of $50,000 and to imprisonment for six months upon conviction.

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

風險傳達工作一覽（二零一七年八月） Summary of Risk Communication Work (August 2017)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	110
公眾查詢 Public Enquiries	94
業界查詢 Trade Enquiries	222
食物投訴 Food Complaints	1
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	5
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	29
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	55