食物安全焦點
Food Safety Focus

食物安全中心 Centre for Food Safety

食物環境衞生署 Food and Environmental Hygiene Department

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氰化物中毒與木薯
Cyanide Poisoning and Cassava

食物安全中心
風險傳達組
科學主任郭麗儀女士報告

Reported by Ms. Joey KWOK, Scientific Officer,
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背景

今年一月十四日，食物安全中心(中心)呼籲市民避免進食由Tixana Australia Pty Ltd公司生產的Piranha牌零食，因為澳洲及新西蘭食物標準局發出警告，指其中一批出口產品驗出含量較平常為高的氰甙，相信是天然存在於配料木薯。中心已聯絡澳洲當局了解事件，並得悉有關產品曾出口到香港，故呼籲本港業界停售有關產品。

氰甙是什麼？

氰甙是一組化學化合物，天然存在於2 000多種植物中，目前有至少25種已知的氰甙存在於植物的可食用部分中。氰甙本身可說是沒有毒性的。不過，植物組織在咀嚼過程中或腸道中菌群存在的情況下，均會引發β-葡萄糖苷酶產生水解作用，使氰甙分解並釋出對動物和人類均有毒的氫氰酸。含氰甙植物的潛在毒性主要取決於其產生氫氰酸的能力。

氰化物中毒有何症狀？

人類急性氰化物中毒的臨牀症狀包括呼吸急速、血壓下降、脈搏急速、眩暈、頭痛、胃痛、嘔吐、腹瀉、精神錯亂、顫搐和抽搐。當氰化物攝入量超過個人的解毒上限，可引致氰化物中毒死亡。以人類而言，按每公斤體重計算，攝入0.5至3.5毫克氫氰酸足以導致急性中毒死亡。兒童由於體型較小，尤其易受氰化物中毒影響。

慢性氰化物中毒可令人出現甲狀腺功能失調和神經錯亂等症狀。長期食用木薯而又營養不良的人較易出現慢性氰化物中毒。

木薯是什麼？有何用途？

木薯的莖部含豐富的碳水化合物，主要為澱粉。根據聯合國糧食及農業組織，稻米、玉米和木薯依次為熱帶地區中人們攝取熱量的首三大食物來源。木薯的食用方法甚多，其莖部可整個食用，又或經磨碎或製成脆片享用。此外，還可製成木薯粉，然後用作烹飪材料或製成以木薯作為主要配料的其他食品，例如麵包、餅乾和混入木薯粉圓的布丁及飲料。在一些國家，人們亦會食用經過沸水長時間烹煮的木薯葉。除了供人食用外，木薯製品還可用作動物飼料。

如何處理木薯才可確保安全食用？

木薯的種類很多，大致上分為甜木薯和苦木薯兩大類，含有多於一種的氰甙。甜木薯莖部中

Background

On 14 January 2008, the Centre for Food Safety (CFS) advised members of the public to avoid consuming Piranha brand crackers and snacks manufactured by Tixana Australia Pty Ltd. The appeal was made following a warning issued by the Food Standards Australia New Zealand (FSANZ) due to the higher-than-usual levels of naturally occurring cyanogenic glycosides in the ingredient cassava in a batch of exported vegetable crackers. The CFS contacted the relevant authorities and was informed that the affected products had been exported to Hong Kong. The CFS alerted the trade to stop selling the affected products.

What are Cyanogenic Glycosides?

Cyanogenic glycosides are a group of chemical compounds which occur naturally in over 2 000 plant species. There are at least 25 cyanogenic glycosides known to be found in the edible parts of plants. Cyanogenic glycosides alone are relatively non-toxic. However, as a result of enzymatic hydrolysis by beta-glucosidase following maceration of plant tissues as they are eaten, or by the gut microflora, cyanogenic glycosides are broken down to release hydrogen cyanide which is toxic to both animals and humans. The potential toxicity of a cyanogenic plant depends primarily on its capacity to produce hydrogen cyanide.

What are the Symptoms of Cyanide Poisoning?

In humans, the clinical signs of acute cyanide intoxication include rapid respiration, drop in blood pressure, rapid pulse, dizziness, headache, stomach pain, vomiting, diarrhoea, mental confusion, twitching and convulsions. Death due to cyanide poisoning can occur when the cyanide level exceeds the limit an individual is able to detoxify. The acute lethal dose of hydrogen cyanide for humans is reported to be 0.5 to 3.5 mg per kilogram of body weight. Children are particularly at risk because of their smaller body size.

Chronic cyanide intoxication may lead to the development of certain conditions including disturbance of thyroid function and neurological disorders. It tends to affect those individuals who have regular long-term consumption of cassava with poor nutrition status.

What is Cassava? What is it Used for?

The roots of cassava are rich in carbohydrates, mainly starch. According to Food and Agriculture Organization, cassava is the third most important source of calories in the tropics, after rice and corn. Cassava is consumed in a variety of ways, including eaten as whole root, grated root or root chips. In addition, it is prepared into flour which in turn can be used for cooking or production of cassava-based products such as breads, crackers, and puddings or beverages made with tapioca pearls. Cassava leaves

焦點個案
Incident in Focus

的氫氰酸含量，按每公斤新鮮重量計算，是少於50毫克，而苦木薯則可高達每公斤400毫克。

甜木薯莖部在去皮和徹底烹煮後，一般可供安全食用。不過，苦木薯莖部則需經過多重處理程序，其中一種傳統的處理方法，是先把苦木薯莖部去皮和磨碎，再把磨碎部分長時間浸泡在水中，以便進行滲濾和發酵過程，最後徹底煮熟，讓容易揮發的氫氰酸氣體釋出。此外，亦可先把木薯莖部切成小塊，再浸泡在水中並以沸水烹煮，這種方法尤其能有效減低木薯中的氰化物含量。雖然新鮮木薯必須採用傳統方法減低其毒性，但經過充分加工程序的木薯粉和以木薯作為主要配料的食品，由於當中的氰化物含量非常低，故可供安全食用。

加入木薯粉圓的珍珠奶茶
Pearl milk tea drink with tapioca pearls

有沒有其他可食用植物含有氰甙？

竹筍是亞洲人常吃的食品。竹筍中的氰甙可在沸水中迅速分解。至於其他含氰甙的可食用植物，還有部分核果果核內的種子(例如北杏)和利馬豆等。

給消費者的建議

1. 向可靠的供應商購買食物。
2. 正確處理木薯和竹筍等含氰甙的植物，然後才可進食。含氰甙的植物應切成小塊，浸泡在水中，並以沸水徹底烹煮。
3. 保持均衡飲食，以免因偏食幾類食品而過量攝取有害的化學物。

給業界的建議

1. 向可靠的來源採購食物和配料。
2. 奉行優良製造規範，以盡量減低食物中含天然毒素的風險。

更多資料

如需更多有關天然毒素的資料，請瀏覽下列網頁：

- 中心有關食用植物中的天然毒素的風險評估研究報告
- 中心有關蔬果含有的天然毒素的風險簡訊

竹筍
Bamboo shoot

are also eaten in some countries following extensive boiling. Apart from being used as human food, cassava products are also used as animal feed.

木薯
Cassava

How should Cassava be Processed to Render it Safe for Consumption?

Cassava contains more than one form of cyanogenic glycosides. Different varieties of cassava are generally classified into two main types: sweet cassava and bitter cassava. Sweet cassava roots contain less than 50 mg per kilogram hydrogen cyanide on fresh weight basis, whereas that of the bitter variety may contain up to 400 mg per kilogram.

Sweet cassava roots can generally be made safe to eat by peeling and thorough cooking. However, bitter cassava roots require more extensive processing. One of the traditional ways to prepare bitter cassava roots is by first peeling and grating the roots, and then prolonged soaking of the gratings in water to allow leaching and fermentation to take place, followed by thorough cooking to release the volatile hydrogen cyanide gas. Cutting the roots into small pieces, followed by soaking and boiling in water is particularly effective in reducing the cyanide content in cassava. Whilst fresh cassava requires traditional methods to reduce its toxicity, adequately processed cassava flour and cassava-based products have very low cyanide contents and are considered safe to use.

What Other Edible Plants Contain Cyanogenic Glycosides?

Bamboo shoot is a popular food item among Asian population. The cyanogenic glycoside present in bamboo shoot is decomposed quickly in boiling water. Other edible plants containing cyanogenic glycosides include kernels within the pits of some stone fruits (e.g. bitter apricot kernels), lima beans, etc.

Advice to Consumers

1. Buy food from reliable suppliers.
2. Prepare cyanogenic plants such as cassava and bamboo shoot properly before consumption. Cyanogenic plants should be cut into smaller pieces, soaked in water and cooked thoroughly in boiling water.
3. Maintain a balanced diet to avoid excessive exposure to harmful chemicals from a small range of food items.

Advice to the Trade

1. Source food and ingredients from reliable sources.
2. Adhere to the Good Manufacturing Practice to minimise the risk of natural toxins in food.

Further Information

Further information about natural toxins can be obtained from the following webpages:

- CFS Risk Assessment Study Report on Natural Toxins in Food Plants
- CFS Risk in Brief on Naturally Occurring Toxins in Vegetables and Fruits

食物中的殘餘除害劑 (上篇)
Pesticide Residues in Food (Part I)

食物安全平台
Food Safety Platform

食物安全中心
風險評詁組
科學主任林漢基博士報告

Reported by Dr. John LUM, Scientific Officer,
Risk Assessment Section,
Centre for Food Safety

我們不時聽到有關食物中的殘餘除害劑及其損害人體健康的各種報道，但我們真的認識除害劑(亦稱農藥)嗎？本欄將會一連三期以除害劑為題，由其起源以至安全評估和如何制定食物中的准許含量等問題，逐一細探。

除害劑無處不在

從廣義而言，除害劑指任何用於防治、殺滅、驅趕或減少有害生物的物質或混合物。至於有害生物，則指任何會損毀農作物或房產，又或影響人們或其他動物健康的生物。除害劑通常用作對付這些有害生物，並在環境中無處不在。很少人會從未在家中使用過蟑螂噴霧。

部分除害劑是專為控制食物生產過程中(特別是農作物生長期間)的有害生物而研製的。在農作物生長期間常用的除害劑可以分為三類：用作控制蟲害的除蟲劑；用作控制真菌傳播的除真菌劑；以及用作控制雜草競生情況的除草劑。本文將會集中討論在食物生產過程中使用的除害劑。

除害劑的簡史

遠在約西元前一千年，人們已利用硫磺等化學物作為除害劑。化學科學的進步和密集式農耕法的採用令多種更有效的化學除害劑相繼研製出來。化學除害劑曾一度被封為人類戰勝大自然的產品。不過，隨後因應除害劑的抗藥性問題、對環境的破壞和對人體健康的不良影響，以致其使用蒙上陰影。在各國採取更嚴格的規管措施後，除害劑似乎在農務中找到適當的位置。有機磷酸鹽及有機氯是化學除害劑中的兩個主要類別，現就這兩類除害劑及其食物安全問題詳述如下：

種植農作物時使用除害劑
Application of pesticides in crop production

- 有機磷酸鹽除害劑 —— 有機磷酸鹽除害劑屬於除蟲劑，透過干擾乙酰膽鹼這種神經遞質損害昆蟲的神經系統。不少有機磷酸鹽除害劑造成動物的急性毒性影響，主要損害其神經系統。曾引致人類急性食物中毒個案的甲胺磷，就是一種有機磷酸鹽除害劑。由於甲胺磷和多種有機磷酸鹽除害劑可能會影響人體健康，現已在許多國家中停用。
- 有機氯除害劑 —— 滴滴涕是其中一種最為人熟悉的有機氯除害劑。這種廣譜除蟲劑於四十年代發明，旋即成為全球最廣為使用的除害劑。不過，滴滴涕會長時間存留在環境中，加上專家在六十年代發現滴滴涕會影響多種動物的生殖和發育情況，多國自此不准使用滴滴涕。

雖然大部分常用除害劑屬於合成化學物，但隨着追求有機產品的人日益增多，生物除害劑近年大受歡迎。生物除害劑是從天然物質(例如動物、植物和細菌等)中提取而製成的除害劑，其中以來自名為“蘇雲金桿菌”細菌的除害劑最為人熟悉。

食物中是否不應含有殘餘除害劑？

正確使用除害劑可改善食物的產量和質量。半數農作物慘遭害蟲吃掉的農耕日子或已成為過去；不過，在食物生產過程中使用除害劑無可避免會令部分食品含有一些殘餘物。正確使用除害劑可以減低其損害人體健康的風險。雖然大部

From time to time, we hear different reports on pesticide residues in food and their adverse effects on human health. However, do we really KNOW pesticides? In the coming three issues, this column will have a closer look at pesticides – from their origins to safety evaluation and setting of permitted levels in food.

Many Things around Us are Pesticides

In broad sense, pesticide is any substance or mixture of substances intended for preventing, destroying, repelling or mitigating pest. Any living organisms that are not wanted because of their damage to crops or properties, or affect human or other animal health could be regarded as pests. Pesticides are commonly used to treat these pests and their presence is ubiquitous. Few people have not applied domestic pesticides such as cockroach sprays at home.

Some pesticides are specifically developed to control pests in food production, especially during crops growing. Classes of pesticides commonly used in crops growing include insecticides (to control insect infestations), fungicides (to control the spread of fungal diseases) and herbicides (to control the competing effects of weeds). In this article, we will focus on pesticides used in food production.

A Brief History of Pesticides

As early as around 1000 BC, people have used different chemicals (e.g. sulphur) as pesticides. Advances in chemical science and the adoption of intensive farming practice have led to the development of more effective chemical pesticides. Chemical pesticides were, at one stage, championed as human's success over nature. But pesticide resistance, damage to the environment and adverse effects on human health have overshadowed their subsequent use. With more stringent control on pesticides, pesticides have apparently found their place in the agricultural system. Two important classes of chemical pesticides, organophosphate and organochlorine, with food safety concerns are detailed below:

- Organophosphate (OP) pesticides – OP pesticides are insecticides act by affecting the nervous system of insects through disrupting the neurotransmitter acetylcholine. Many OP pesticides are also acutely toxic to animals, mainly by affecting the nervous systems. Methamidophos, which has caused acute food-poisoning cases in human, is an OP pesticide. The use of methamidophos and many OP pesticides has been stopped in many countries due to their potential adverse effects in human.
- Organochlorine (OC) pesticides – One of the most well-known OC pesticides is DDT. DDT is a broad-spectrum insecticide invented in the 1940s and quickly became the most widely used pesticide in the world. However, DDT persists in the environment and was found to affect reproduction and development in a number of animal species in the 1960s. Since then, DDT was not permitted to be used in many countries.

Although most of the commonly used pesticides are synthetic chemicals, biopesticides have gained their popularity in recent years, as a result of increasing popularity for organic products. Biopesticides are pesticides derived from natural materials such as animals, plants and bacteria. The most well-known biopesticide comes from the bacteria *Bacillus thuringiensis* (Bt).

Pesticide Residues in Food – the Wrong Item in the Wrong Place?

The proper use of pesticides could improve the quantity and quality of food. The days that farmers found half of their crops being eaten up by worms might have been gone! However, the use of pesticides in food production would inevitably leave some residues in some of the products. Risk to human health could be reduced with proper usage of pesticides. Although most of the pesticides are used during crops growing (pre-harvest),

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分除害劑是在農作物生長期間(收割前)使用，但除害劑亦可在貯存和運輸農作物期間(收割後)使用。此外，食用動物亦會因吃下含殘餘除害劑的飼料而在體內積聚殘餘除害劑。

即使在食物生產過程中沒有刻意地使用除害劑，除害劑亦可能會引起殘留問題。由於部分除害劑會長時間存留在環境中，故可能會有微量的除害劑污染食物。

本欄將於下一期探討除害劑的安全問題，讀者切記留意！

pesticides could also be applied during storage and transport of the crops (post-harvest). Moreover, food animals may accumulate pesticide residues in their body through the consumption of feed containing pesticide residues.

Pesticides that are not applied intentionally during food production may also cause residual problems. Some pesticides are persistent in the environment and traces of them may contaminate our food.

The next issue of Food Safety Platform will cover the safety of pesticides. Do not miss it!

食物事故點滴
Food Incident Highlight

甲胺磷與餃子

今年一月底，本港傳媒報道日本發生冷藏餃子懷疑受除害劑甲胺磷污染的食物事故。由於同一來源的食品在本港有售，有關公司已自願收回有關食品。

甲胺磷屬於有機磷除害劑，其毒性廣為人知。本港在二十世紀後期曾發生多宗因在蔬菜中濫用甲胺磷引致的食物中毒個案。甲胺磷中毒症狀包括嘔吐、腹瀉、腹痛、噁心、眩暈和身體痲痺，嚴重的患者可能會出現呼吸困難、視力模糊和抽搐。

在採購內地供港的蔬菜時，蔬菜進口商應向內地註冊供港菜場和收購／加工企業採購。在食用前，市民應正確清洗和處理蔬菜，以盡量減低由膳食引致的除害劑中毒機會。

Methamidophos and Dumplings

In late January 2008, local media reported on a food incident concerning frozen dumplings that were suspected to be contaminated with the pesticide methamidophos in Japan. As products from the same source were available locally, they were voluntarily removed from sale.

Methamidophos is an organophosphorus pesticide that had caused a large number of food poisoning cases in Hong Kong when it was abused in vegetables in the later part of the last century. Symptoms of methamidophos poisoning include vomiting, diarrhoea, abdominal pain, nausea, dizziness and numbness. In severe cases, people may have breathing difficulties, blurred vision and convulsion.

When sourcing vegetables on the Mainland for export to Hong Kong, vegetable importers should acquire vegetables from registered farms and collecting / processing establishments. Vegetables should be washed and prepared properly before consumption in order to minimise the chance of pesticide food poisoning.

鯖魚中毒

今年一月二十五日，衞生防護中心宣布正調查一宗鯖魚中毒個案。五人吃了由食物供應商提供的午膳半小時至一個半小時後出現鯖魚中毒症狀，包括面紅、心跳加速、眩暈、嘔吐和腹瀉。由食物安全中心進行的調查顯示，牛油魚魚柳樣本含有組胺，含量為百萬分之一千七百，遠超食品法典委員會所訂的行動水平，即百萬分之二百。

某些魚類(包括金槍魚(吞拿魚)、鯖魚、沙甸魚和鯷魚等鯖科魚類)天然含有組胺酸。如這些魚類貯存不善，尤其是捕獲後的一段時間，某些細菌會把魚類中的組胺酸轉化成組胺。由於烹煮不能消除組胺，人們吃下這些魚類可能會引致食物中毒。

大家應向可靠來源購買魚類。為防止魚類(尤其是鯖科魚類)腐壞，冰鮮魚類應貯存在攝氏4度或以下，而冷藏魚類則貯存在攝氏-18度或以下。


鯖魚
Mackerel

Scombroid Fish Poisoning

The Centre for Health Protection announced on 25 January 2008 that they were investigating a scombroid fish poisoning case. Five people consumed lunch supplied by a caterer and half to 1.5 hours later, developed symptoms of scombroid fish poisoning, which included flushing, rapid heart beat, dizziness, vomiting and diarrhoea. The investigations by the Centre for Food Safety revealed that a sample of butterfish fillet contained 1 700 ppm of histamine, which was well above the action level of 200 ppm set by the Codex Alimentarius Commission.

Certain fish, including those of the Scombroid family like tuna, mackerel, sardine and anchovy, contains the amino acid histidine naturally. When the fish are improperly stored, particularly soon after catch, certain bacteria will convert histidine present into histamine. Consumption of such fish may cause food poisoning as cooking cannot destroy histamine.

People should purchase fish from reliable sources and store fish, especially fish of the Scombroid family, at four degree Celsius or below for chilled fish and -18 degree Celsius or below for frozen fish to prevent spoilage.


沙甸魚
Sardine

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

風險傳達工作一覽（二零零八年一月） Summary of Risk Communication Work (January 2008)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	64
公眾查詢 Public Enquiries	136
業界查詢 Trade Enquiries	177
食物投訴 Food Complaints	379
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	58
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	13