



食物安全中心
Centre for Food Safety

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焦點個案 Incident in Focus

二噁英和二噁英樣化合物的總膳食研究 Total Diet Study on Dioxins and Dioxin-like Compounds

食物安全中心
風險評估組
科學主任王慧琮女士報告

Reported by Ms. Waiky WONG, Scientific Officer,
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食物安全中心(中心)在上月公布本港首個總膳食研究有關二噁英和二噁英樣多氯聯苯的研究結果。研究結果顯示,一般市民的健康受到二噁英和二噁英樣多氯聯苯嚴重不良影響的機會不大,而市民從膳食攝入這些化合物的最主要來源是動物源性食物,特別是魚類、肉類及家禽。本文將以問答形式,針對讀者關注的內容,提供具體解釋。

問: 食物受二噁英和二噁英樣多氯聯苯污染是否嚴重?

答: 二噁英和二噁英樣多氯聯苯屬於污染物,可長時間存留在環境,並在食物鏈中生物累積。因此,食物無可避免會含有二噁英和二噁英樣多氯聯苯。由於這些化合物具有親脂性,故脂肪組織通常會含有較多二噁英和二噁英樣多氯聯苯。

根據首個總膳食研究結果顯示,全部142個混合樣本均驗出含有不同水平的二噁英和二噁英樣多氯聯苯。此外,攝入量一般和攝入量高的市民每月從膳食攝入二噁英和二噁英樣多氯聯苯的分量分別為每公斤體重21.92皮克毒性當量和59.65皮克毒性當量[1克 = 10¹²皮克;國際上用毒性當量來表示這類化合物的濃度]。兩者均低於聯合國糧食及農業組織/世界衛生組織聯合食品添加劑專家委員會所定的安全參考值[即暫定每月可容忍攝入量為每公斤體重70皮克毒性當量]。換言之,本港一般市民的健康受到二噁英和二噁英樣多氯聯苯嚴重不良影響的機會不大。

問: 既然總膳食研究結果顯示,大多數二噁英的攝入量跟吃魚有關,那麼我是否應該三餐都不吃魚?

答: 魚類是本港市民常吃的食物。根據總膳食研究的檢驗結果,部分魚類混合樣本的二噁英和二噁英樣多氯聯苯含量屬於偏高。數據顯示,魚類是市民從膳食中攝入二噁英和二噁英樣多氯聯苯的主要來源。另一方面,魚類混合樣本的含量亦差異甚大,由每克0.012皮克毒性當量至1.056皮克毒性當量不等。此外,魚類含有優質蛋白質以及奧米加-3脂肪酸等多種人體所需的營養素。整體來說,適量進食多種魚類便可在風險和益處之間取得平衡。

問: 懷孕或授乳婦女應否避免喝魚湯?

答: 懷孕或授乳婦女從魚湯攝入二噁英和二噁英樣多氯聯苯受到關注。研究顯示,在所有檢

Last month, the Centre for Food Safety (CFS) released the results of the First Hong Kong Total Diet Study (TDS) on dioxins and dioxin-like polychlorinated biphenyls (PCBs), which revealed that the general population was unlikely to experience major undesirable health effects of dioxins and dioxin-like PCBs. The findings also suggested that food of animal origin, particularly fish, meat and poultry, was the predominant route of exposure. This article will address concerns of the public in Q & A format.

Q: Is food contamination by dioxins and dioxin-like PCBs serious?

A: Dioxins and dioxin-like PCBs are contaminants that persist in the environment and bioaccumulate in the food chain, hence, their presence in food is unavoidable. Due to their affiliation with fat, they tend to accumulate in fat tissue at higher concentrations.

Based on findings of the first TDS, all 142 composite samples were detected with dioxins and dioxin-like PCBs at various levels and the monthly dietary exposures were estimated to be 21.92 and 59.65 picograms (pg) TEQ/kg body weight (bw) for average and high consumer of the population respectively. [1 g = 10¹²pg; TEQ is the abbreviation of toxic equivalent which is used internationally for expressing the concentration of these compounds] Both were below the safety reference value [i.e. the provisional tolerable monthly intake (PTMI) of 70 pg TEQ/kg bw] established by the Joint Food and Agriculture Organization/ World Health Organization (WHO) Expert Committee on Food Additives (JECFA). In other words, the general population in Hong Kong was unlikely to experience major undesirable health effects of dioxins and dioxin-like PCBs.

Q: The TDS found that most dioxin exposure was related to eating fish. Should I take out fish in my usual diet?

A: Fish is a popular food in Hong Kong. The TDS found some composite fish samples contained high levels of dioxins and dioxin-like PCBs. It followed that fish was found to be a significant dietary source of dioxins and dioxin-like PCBs. On the other hand, their levels among the fish composite samples varied a lot from 0.012 to 1.056 pg TEQ/g. Besides, fish contains high quality proteins and many other essential nutrients such as omega-3 fatty acids. Overall speaking, moderate intake of a variety of fish can balance the risk and benefits.

Q: Should a pregnant or lactating woman avoid drinking fish soup?

A: Concern has been raised about the exposure from drinking fish soup among pregnant or lactating women.

焦點個案
Incident in Focus

測的樣本中，中式湯水混合樣本的二噁英和二噁英樣多氯聯苯含量最低。飲用魚湯不大可能會令人過量攝入這些化合物。若大家真的很擔心，喝湯前先把油脂去掉，便可減低其攝入量。

問：食物安全中心會否提供總膳食研究所抽取各個食物樣本的二噁英含量，以便市民在選擇食物時有所依據？

答：總膳食研究並沒有個別食物樣本的二噁英含量數據。這是因為研究人員從市面上抽取同一種食物的不同樣本後，會先處理成可食用狀態，然後合併為一個單一混合樣本才進行分析。換言之，用作分析的混合樣本是來自不同來源，所得數字是某物質的平均含量，而並非個別數據。

問：長者攝入二噁英的風險是否較高？

答：這項研究顯示，在長者的人口組別中，攝入量高的長者從膳食攝入二噁英和二噁英樣多氯聯苯的分量略高於暫定每月可容忍攝入量。不過，由於暫定每月可容忍攝入量着眼於人一生的攝入量，因此只要平均攝入量並非長期超出這一數值，偶有超出的情況並不一定表示對長者的健康有影響。

注意要點

1. 二噁英和二噁英樣化合物屬於廣泛存在的環境污染物，我們無可避免會攝入這些化合物。
2. 一般市民從膳食攝入二噁英和二噁英樣多氯聯苯以致健康受到嚴重不良影響的機會不大。
3. 大家應適量進食多種魚類，因為魚類含多種人體所需的營養素。

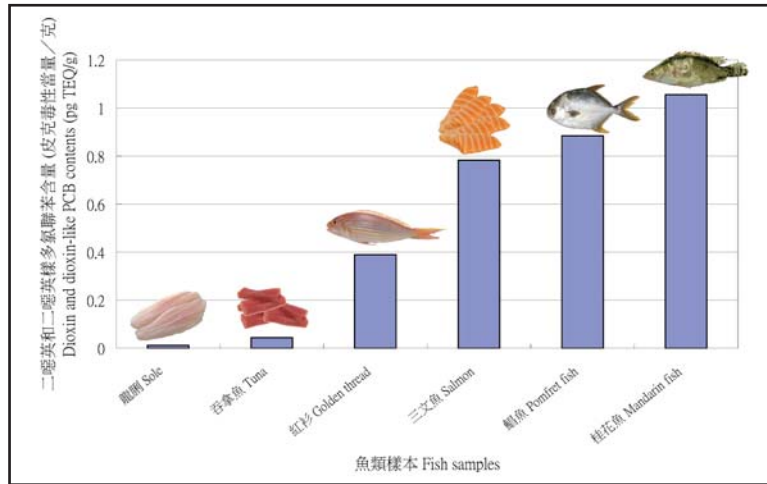
給市民的建議

- 去掉肉類的脂肪和食用低脂奶類製品。
- 保持均衡及多元化的飲食，包括進食多種蔬果。
- 適量進食多種魚類，因為魚類含多種人體所需的營養素。

香港首個總膳食研究

中心在二零一零年三月展開總膳食研究，評估香港市民整體從膳食攝入逾130種物質(包括污染物和營養素)的分量，以評估攝入這些物質對健康帶來的風險。這項研究包括購買和處理食物，化驗分析和膳食攝入量評估。簡言之，研究會考慮食物在烹煮過程中可能出現的變化，檢測食物在可食用狀態下所含有的物質分量。

研究根據本港市民食物消費量模式，選出150種市民經常食用的食物，一共抽取了1 800個樣本。這些樣本會製成可食用狀態，然後合併成600個混合樣本，其中來自71種食品的142個混合樣本(主要是動物源性食物)會進行二噁英和二噁英樣多氯聯苯檢測。



圖一：不同魚類的二噁英和二噁英樣多氯聯苯含量
Figure 1. Dioxin and dioxin-like PCB contents among various fish

individual food samples collected for TDS so that the public can make the right choice of food?

A: The TDS is not able to provide dioxin levels in individual food samples. It is because individual samples of the same food collected from the market were prepared into table ready forms and then combined into a single composite sample for analysis. In other words, the composite samples for analysis were derived from various sources, in which average substance levels, instead of individual data, were obtained.

Q: Are elderly individuals at a higher risk to dioxin exposure?

A: Among the elderly, dietary exposures of high consumers were found slightly exceeding the PTMI in our study. However, it does not necessarily mean that their health is at risk provided that the average exposure over long period has not exceeded the PTMI as its emphasis is on a lifetime exposure.

Key Points to Note

1. Exposures to dioxins and dioxin-like compounds are unavoidable due to their wide presence as environmental contaminants.
2. General population is unlikely to experience major undesirable health effects of dioxins and dioxin-like PCBs from the diet.
3. Moderate consumption of a variety of fish is recommended as fish contain many essential nutrients.

Advice to Public

- Trim fat from meat and consume low fat dairy products.
- Have a balanced and varied diet including a wide variety of fruit and vegetables.
- Consume a variety of fish moderately as fish contain many essential nutrients.

The First Hong Kong Total Diet Study

The CFS started to conduct the TDS in March 2010 for estimating dietary exposures of the Hong Kong people to over 130 substances including contaminants and nutrients and assess the associated health risks. The study comprises food purchase and preparation, laboratory analysis and dietary exposure estimation. In essence, the substance levels are measured in foods in table-ready forms, taking into consideration any possible changes during cooking.

Based on the food consumption pattern of the local population, 150 foods commonly consumed were selected. A total of 1 800 samples were collected and prepared into table ready forms, and combined into 600 composite samples for analysis. Among them, 142 composite samples from 71 food items, mainly food of animal origins, were tested for dioxins and dioxin-like PCBs.

In our study, the composite Chinese soup samples were found containing dioxin and dioxin-like PCBs at the lowest level (mean: 0.007 pg TEQ/g) among all the samples tested. Drinking fish soup is unlikely to result in excessive exposure to dioxins and dioxin-like PCBs. For those who are really concerned, skimming away the fat before drinking the soup can be an option to reduce the exposure.

Q: Would CFS provide the dioxin levels in

人畜共患病與食物安全

Zoonoses and Food Safety

食物安全中心
獸醫公共衛生組
李卓偉獸醫師報告

Reported by Dr. Brian Li, Veterinary Officer,
Veterinary Public Health Section,
Centre for Food Safety

人畜共患病是指脊椎動物與人類之間自然傳播的疾病和感染疾病。在所有傳染病中，超過60%的傳染病和75%的新興傳染病是人畜共患的。從圖一可見，人畜共患病是人類和動物疾病之間交疊的部分。動物及其生態系統與人類的食物鏈息息相關，在同一個生態系統中，微生物可在人類和動物之間互傳。我們應致力預防動物的疾病傳播給人類。

與食物安全有關的人畜共患病的感染途徑

雖然人類感染動物身上疾病的途徑不一，但處理受感染的食用動物或食用其製品，仍是人畜共患傳染病最常見的感染途徑。

消費者的感染途徑

當你吃下受沙門氏菌污染的生雞蛋，或者未經巴士德消毒法處理而含有李斯特菌的芝士時，便已不知不覺地把病原體吞下肚子裡。沙門氏菌和李斯特菌這兩種在養殖動物身上常見的微生物，就是這樣隨着食物鏈成為我們的腹中之物。此外，生吃受污染的水產，亦有可能令人染病。例如惡名昭彰的寄生蟲中華肝吸蟲，便是經由進食生或未徹底煮熟的淡水魚而感染的。

業界人士的感染途徑

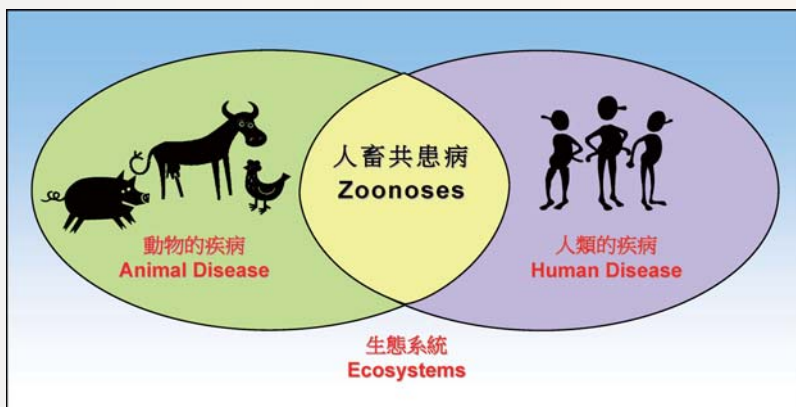
工作上需要處理動物的人士由於必須直接或間接與動物接觸，患上人畜共患病的風險也較高。屠宰員在處理受污染的肉類時，豬型鏈球菌有可能由他皮膚上的傷口而進入身體；加工廠的工人如果沒有穿着合適的保護衣物，亦有可能因直接或間接接觸動物屠體而感染寇熱或鈎端螺旋體病；牛奶場工人接觸了染上牛痘、布氏桿菌病、或腸胃病如大腸桿菌的牛隻，亦有可能因而染病。

健康一體

“健康一體”的概念屬全球策略，旨在鼓勵國際間在人類、動物以至環境層面，加強跨界別的合作和溝通，最終達到改善全球人類和動物健康的目標。

鑑於在動物身上和環境中發現的新興疾病越來越多，“健康一體”這個防控疾病的概念近來備受關注。醫療及獸醫界開始互相分享資源，如診斷及研究成果，以及各種資訊等。只要食物安全系統內各界別同心協力，便能及早發現食物鏈裡的動物和環境中可能會傳給人類的病原體，並作出有效的人畜共患疾病防控措施。

Zoonoses can be defined as diseases and infections naturally transmitted between vertebrate animals and humans. More than 60% of all human infections and 75% of emerging human infections are zoonotic in nature. Diagram 1 illustrates the position of zoonoses, which lies between human and animal diseases. As animals and their living ecosystems are



圖一：人畜共患病關係圖
Diagram 1. Position of Zoonoses

important components of the human food chain, microorganisms could pass between human and animals within the same ecosystems. Efforts should be made to prevent diseases occurring in animals from spreading to humans.

Possible Exposures of Zoonotic Infection Related to Food Safety

Although there are many routes by which human can get a disease from animals, working with infected food animals or consuming their food products remains the most important routes of zoonotic infection.

For Consumers

A member of the general public may have eaten food contaminated with pathogens when he eats uncooked eggs contaminated with Salmonella or unpasteurised cheese tainted with Listeria. Both microorganisms found in farm animals could pass into food along the food chain. At the same time, people may also get sick from consuming raw contaminated aquatic products. One of the notorious examples is the parasitic infestation with *Clonorchis sinensis* (commonly known as Chinese liver fluke) from eating raw or undercooked freshwater fish.

For Members of Trade/Industry

People working close to animals have a higher risk of contracting zoonotic diseases through direct or indirect contact with animals. A butcher could contract *Streptococcus suis* via lesions on his skin after contact with contaminated meat. Workers in a processing plant with improper protective clothing can be infected with Q Fever or Leptospirosis through direct or indirect contact with infectious fluid from animal carcasses. Milkers in dairy farms may get sick from contacting cattle infected with diseases such as cow pox, brucellosis, or gastrointestinal disease like *E.coli*.

One Health

One Health is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment, aiming to improve human and animal health globally.

Since emerging diseases are increasingly found in animals and the environment, the concept of One Health for disease control received much attention recently. Resources such as diagnostic and research works and information are shared between both the medical and veterinary teams. With such cooperation in a food safety system, potential zoonotic pathogens are identified in animals and the environment within the food chain and efficient control and prevention of zoonotic diseases can be achieved.

為減低患上人畜共患病的風險，我們建議消費者及處理動物的從業員遵從以下守則：

給消費者的建議

- 處理食物時或接觸動物後徹底洗淨雙手。
- 生熟食物分開存放，以避免交叉感染。
- 把食物徹底煮熟，避免進食未經烹煮的食物。
- 按照製造商的指示(如有的話)，以正確方式貯存食物。

給業界的建議

- 只從可靠的供應商採購食物及原材料，特別是食用動物製品。
- 在工作間採用「良好作業規範(GMP)」，把因接觸動物或其製品而染病的風險減到最低。
- 為加工廠和屠房的員工提供足夠的保護裝備。
- 保持良好的工作環境，善待動物。地方整潔、溫度適中，對員工和動物的健康都有好處。
- 家禽業從業員、從事養豬及屠宰豬隻行業的人士直接種流感疫苗。

To reduce the risk of zoonoses, consumers and workers dealing with animals can take heed of the following advice:

Advice to Consumers

- Wash hands properly when preparing food or after touching animals.
- Prevent cross-contamination of raw and cooked food by separating them in storage.
- Cook foods thoroughly and avoid tasting raw food.
- Store foods in proper condition according to the manufacturers' instruction if available.

Advice to Trade

- Only obtain food and ingredients from reliable sources, particularly for food animal products.
- Adopt Good Manufacturing Practice at workplace to minimise the risk of getting infection from contacting with animals or animal products.
- Provide adequate protective gear for staff in processing plant and slaughter house.
- Maintain good working environment and welfare to animals. Tidiness and comfortable temperature should be maintained so as to improve general health of both workers and animals.
- Poultry workers, pig farmers and pig-slaughtering industry personnel are recommended to receive the influenza vaccine.

食物事故點滴 Food Incident Highlight

罌粟殼與麻辣火鍋

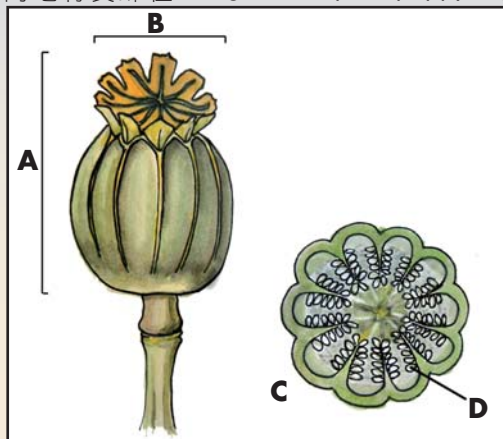
二零一一年十二月十一日，本港某報章報道，內地有食肆在四川麻辣火鍋的湯底內摻入磨碎的罌粟殼。該報道指罌粟殼在內地雖然被禁止加入食物內，但非常容易買到，因此關注罌粟殼可能流入本港食肆。

罌粟含有鴉片，但植株各部位的鴉片含量分布並不均勻。罌粟多個部分包括罌粟殼的鴉片生物鹼(如嗎啡)含量較高，原因是罌粟除種子外整個植株都有導管系統，分泌含鴉片生物鹼的乳汁。據稱罌粟殼的嗎啡含量可介乎0.12%至0.89%或更高。

在香港，罌粟殼受《危險藥物條例》(第134章)規管。因此，食肆不應在食物中添加罌粟殼。

Opium Poppy Capsules and Spicy Hotpots

On 11 December 2011, a local newspaper reported the sale and use of grinded opium poppy capsules as an ingredient of spicy Sichuan hotpot soup base in Mainland China, where such use is illegal. The article had also raised the concern on its possible use in food in Hong Kong due to the ease of obtaining opium poppy capsules in the Mainland.



成熟的罌粟殼各部分 (A: 成熟的罌粟殼; B: 柱頭; C: 成熟罌粟殼的橫切面; D: 種子)

Parts of the mature opium poppy capsules (A: mature capsule, B: crown, C: cross-section of mature capsule, D: seed).

Opium poppy plant contains opium, but its distribution is uneven. High levels of opium alkaloids like morphine can be found in many parts of the opium poppy plant, including the capsules, because the tube system that produces the milky sap is present in the whole plant except for the seeds. The opium poppy capsules are reported to contain morphine at levels ranging from 0.12% to 0.89% or above.

In Hong Kong, the Dangerous Drugs Ordinance (Cap. 134) covers opium poppy capsules. Restaurants should therefore not use opium poppy capsules as a food ingredient.

風險傳達 工作一覽 Summary of Risk Communication Work

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