

大閘蟹含二噁英和二噁英樣多氯聯苯
超出食物安全中心的行動水平
- 常見問題 -

**Hairy crabs with dioxins and dioxin-like polychlorinated biphenyls
exceeding CFS' action levels
- Frequently Asked Questions -**

1	<p>二噁英和二噁英樣多氯聯苯是什麼？</p> <p>What are dioxins and dioxin-like polychlorinated biphenyls (DL-PCBs)?</p>
	<p>二噁英是一組多氯性芳香族化合物，在環境中無處不在，可自然形成（例如火山爆發和森林大火釋出），亦是燃燒（例如廢物焚化）及各種工業過程（例如製造化學品、以氯漂白紙漿和冶煉金屬）產生的副產品。相反，多氯聯苯則是人工製造的物質，過往作多種不同工業用途，例如製造電子絕緣體或絕緣液體及專用的液壓機液體。</p> <p>Dioxins are a group of polychlorinated aromatic compounds. They are ubiquitous in the environment, occurring naturally (e.g. volcanic eruptions and forest fires), and as by-products of combustion (e.g. waste incineration) and various industrial processes (e.g. production of chemicals, chlorine bleaching of paper pulp and smelting). In contrast, PCBs were manufactured in the past for a variety of industrial uses such as electrical insulators or dielectric fluids and specialised hydraulic fluids.</p>
2	<p>二噁英和二噁英樣多氯聯苯的主要來源是什麼？</p> <p>What are the main sources of dioxins and DL-PCBs?</p>
	<p>二噁英和二噁英樣多氯聯苯是脂溶性的，不易分解，因此多積聚在脂肪組織，並沿食物鏈由其他生物到人類逐漸累積。各種二噁英和二噁英樣多氯聯苯的毒性不一。在所有已鑑別的相關的化合物中，毒性最強的是2, 3, 7, 8- 四氯二苯並對二噁英 (TCDD)。</p> <p>Dioxins and DL-PCBs are lipophilic and persistent in the environment. Hence, they tend to accumulate in fatty tissues and are passed up the food chain from other living organisms to humans. Different dioxins and DL-PCBs have different degree of toxicity. Of all types of related compounds identified, the most toxic one is 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD).</p>

自上世紀七十年代開始，大部分國家已禁止生產和使用多氯聯苯。不過，以不當的方式焚化廢物或不當的方式管理用於處置多氯聯苯的廢物場地，均會令多氯聯苯釋放到環境中，污染土壤和水中沉積物，更會沿食物鏈在生物體內積聚和濃縮。

Production and use of PCBs have been banned by most countries since 1970s. However, PCBs can still be released into the environment from improper ways of burning wastes and poorly-maintained waste sites that contain PCBs. Once released into the environment, they contaminate soil and aquatic sediments leading to bioaccumulation and biomagnification of PCBs through food chains.

二噁英和二噁英樣多氯聯苯會在肉類、家禽或海產的脂肪組織積聚，因此動物的壽命較長，脂肪組織積聚的二噁英和二噁英樣多氯聯苯可能較多。肉類、奶類製品、蛋和魚等動物源性食物的二噁英和二噁英樣多氯聯苯含量通常較高。

Dioxins and DL-PCBs would concentrate in the fatty tissues of meat, poultry or seafood, and animals with a longer lifespan may have a higher potential accumulation of dioxins and DL-PCBs in their fatty tissues. Foods of animal origin such as meat, dairy products, eggs and fish tend to have higher concentrations of dioxins and DL-PCBs.

外國曾發生幾次與二噁英有關的食物危機，令公眾相當關注。在香港，食物環境衛生署一直密切監察食物含二噁英和二噁英樣多氯聯苯的情況。

Some dioxin-related food crisis occurred in overseas countries have raised considerable public attention and concern. In Hong Kong, the situation of dioxins in foods has been closely monitored by the Food and Environmental Hygiene Department.

3 人類從什麼途徑攝入二噁英和二噁英樣多氯聯苯？

What are the sources of human exposure to dioxins and DL-PCBs?

人類會透過食物、食水、空氣和皮膚接觸等途徑攝入二噁英和二噁英樣多氯聯苯，其中食物是最主要的來源。脂肪含量較高的食物，例如肉類、家禽、海鮮、牛奶、蛋類及其製品，是人類攝入二噁英和二噁英樣多氯

	<p>聯苯的主要膳食來源。</p> <p>Sources of human exposure to dioxins and DL-PCBs include food intake, drinking water, air inhalation and skin contact. Dietary intake is by far the most important exposure. Fatty foods such as meat, poultry, seafood, milk, egg and their products are the major dietary sources of dioxins and DL-PCBs.</p> <p>至於水生動物，身體一些部位天然含有較高脂肪量的，同時也會含有較多二噁英和二噁英樣多氯聯苯。例如，魚肝和螃蟹的棕色肉(包括蟹黃／蟹膏及肝胰臟等內臟)含有較多的二噁英和二噁英樣多氯聯苯。</p> <p>For aquatic animals, body parts which naturally have a higher content of fat may also contain a higher amount of dioxins and DL-PCBs. For example, fish livers and brown meat (includes gonads, livers and digestive glands) of crabs are known to contain higher amount of dioxins and DL-PCBs.</p>
4	<p>二噁英和二噁英樣多氯聯苯對健康有什麼影響？</p> <p>What are the health effects of dioxins and DL-PCBs?</p>
	<p>人類如意外地（例如在職業環境中或工業意外後）攝入大量二噁英和二噁英樣多氯聯苯，可引致氯痤瘡、皮膚出疹及變色等皮膚病和體毛過多。國際癌症研究機構已把二噁英和二噁英樣多氯聯苯列為人類的致癌物。長期攝入二噁英和二噁英樣多氯聯苯會牽涉到免疫系統、生殖功能、內分泌系統及發育中神經系統的損害，一些研究亦發現二噁英和二噁英樣多氯聯苯與人的糖尿病、甲狀腺功能異常和心臟病有關。</p> <p>Accidental exposure to large amount of dioxins and DL-PCBs (e.g. in occupational settings or following industrial accidents) could lead to the development of chloracne, skin rashes, skin discolouration and excessive body hair. The International Agency for Research on Cancer (IARC) has classified the dioxins and DL-PCBs as human carcinogens. Long-term exposure to dioxins and DL-PCBs is linked to impairment of the immune system, reproductive function, endocrine system and the developing nervous system. Associations with diabetes, thyroid dysfunction and heart diseases in humans have been reported in some studies.</p>
5	<p>如何量度食物中二噁英和二噁英樣多氯聯苯的毒性？</p> <p>How to determine the levels of toxicity of dioxins and DL-PCBs in</p>

	<p>food?</p> <p>由於各種二噁英和二噁英樣多氯聯苯的毒性不一，二噁英和二噁英樣多氯聯苯的含量是以毒性當量(TEQ)表示。其計算方法是把每種二噁英和二噁英樣多氯聯苯的含量乘以相關的毒性當量因子，得出該種化學物的毒性當量，然後把各種二噁英和二噁英樣多氯聯苯的毒性當量加起來，得出其含量。</p> <p>Different dioxins and DL-PCBs exhibit different toxicity levels. The concentration of dioxins and DL-PCBs was expressed as the toxic equivalent (TEQ) and was calculated by summing up the contribution from each chemical. A TEQ was calculated by multiplying the concentration of the chemical with its corresponding toxic equivalency factor.</p>
6	<p>食物安全中心如何評估香港市民攝入二噁英和二噁英樣多氯聯苯的水平？</p> <p>How does the Center for Food Safety assess the dietary exposure to dioxins and DL-PCBs of the Hong Kong population?</p> <p>食物安全中心在二零一一年十二月公布香港首個總膳食研究的首份報告。該份報告是關於食物中二噁英和二噁英樣多氯聯苯的研究。研究的結論是攝入量一般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為每公斤體重 21.92 皮克毒性當量，攝入量高的市民則為 59.65 皮克毒性當量，兩者的攝入量均低於暫定每月可容忍攝入量（即每公斤體重 70 皮克毒性當量），因此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。</p> <p>In December 2011, the Centre for Food Safety released the first report under the First Hong Kong Total Diet Study which studied dioxins and DL-PCBs in food. The report concluded that the dietary exposures to dioxins and DL-PCBs were 21.92 and 59.65 pg TEQ/kg bw/month for average and high consumer of the population, respectively, which were lower than the PTMI (i.e. 70 pg/kg bw/ month). Therefore, the general population was unlikely to experience major undesirable health effects of dioxins and DL-PCBs.</p>
7	<p>既然二噁英和二噁英樣多氯聯苯廣泛存在於環境和食物鏈之中，什麼水平才算是不理想？標準是什麼？</p> <p>Since dioxins and DL-PCBs are ubiquitous in the environment and in the food chain, what levels can be regarded as unsatisfactory? What</p>

	<p>are the standards?</p>
	<p>在香港，食物環境衛生署一直密切監察食物含二噁英和二噁英樣多氯聯苯的情況。食物安全中心在參考國際做法及本地的膳食習慣（即可食部分包括大閘蟹的褐色肉和白肉[#]）後，把大閘蟹可食部分中的二噁英含量的行動水平訂定為每克食物樣本 3.5 皮克毒性當量（濕重計），及二噁英和二噁英樣多氯聯苯含量總和的行動水平訂定為每克食物樣本 6.5 皮克毒性當量（濕重計）。</p> <p>[#]褐色肉包括蟹黃／蟹膏（即性腺、消化腺和肝臟等部分），而白肉包括蟹、足和肩膀有肉的部分。</p> <p>In Hong Kong, the situation of dioxins and DL-PCBs in foods has been closely monitored by the Food and Environmental Hygiene Department. After considering international practices and local dietary habits (i.e. edible portions of crabs include brown meat and white meat[*]), the Center for Food Safety established action levels for dioxins as 3.5 pg/g wet weight and sum of dioxins and DL-PCBS as 6.5 pg/g wet weight in edible portions of hairy crabs.</p> <p>[*]brown meat includes gonads, livers and digestive glands and white meat includes muscle meat from appendages of the crabs.</p> <p>要注意的是，個別食物縱使超出二噁英和二噁英樣多氯聯苯的行動水平，也不表示對健康有即時危害。</p> <p>It should be noted that for individual foods, the exceedance of action levels of dioxins and DL-PCBs does not imply immediate health risks.</p>
8	<p>其他地方在食物中二噁英和二噁英樣多氯聯苯的標準是什麼？</p> <p>What are the standards for dioxins and DL-PCBs in food elsewhere?</p>
	<p>現時，食品法典委員會並未就食物中二噁英和二噁英樣多氯聯苯含量訂定限量標準。</p> <p>At present, the Codex Alimentarius Commission (Codex) has not established maximum limits for dioxins and DL-PCBs in foods.</p> <p>中國內地並未就食物中二噁英和二噁英樣多氯聯苯含量訂定限量標準。</p> <p>For Mainland China, there is no Guobiao (GB) or action level on dioxins and DL-PCBs.</p> <p>歐洲聯盟當局就魚和魚類產品及其相關產品（包括螃蟹）的肌肉部分中</p>

	<p>二噁英含量總和制定了每克食物樣本 3.5 皮克毒性當量濕重的限量標準，以及就二噁英及二噁英樣多氯聯苯化合物含量總和制定了每克食物 6.5 皮克毒性當量濕重的限量標準。就螃蟹來說，有關限量標準只適用於附屬肢及腹部的肌肉。</p> <p>The European Commission has established maximum levels for dioxins as 3.5 pg/g wet weight and sum of dioxins and DL-PCBs as 6.5 pg/g wet weight in muscle meat of fish and fishery products (including crabs). In case of crabs, these standards apply to muscle meat from appendages and abdomen only.</p> <p>台灣當局則就“魚及其他水產動物之肉及其製品”中二噁英含量總和制定了每克食物 3.5皮克毒性當量濕重的限量標準，以及就二噁英和二噁英樣多氯聯苯含量總和制定了每克食物 6.5皮克毒性當量濕重的限量標準。上述限量標準則適用於整個螃蟹的可食用部分(包括蟹膏／蟹黃及肝胰臟等內臟)。</p> <p>In Taiwan, maximum levels in fish and other aquatic animals as well as their products for dioxins and sum of dioxins and DL-PCBs are 3.5 pg/g wet weight and 6.5 pg/g wet weight respectively. In case of crabs, the maximum levels apply to the entire edible parts of the animals (including internal organs of crabs such as crab roes and hepatopancreas).</p>
9	<p>為什麼以“長期暴露”來評估人體從膳食中攝取二噁英和二噁英樣多氯聯苯的風險？</p> <p>Why “long-term exposure” is used to assess the health risks associated with the dietary exposure to dioxins and DL-PCBs?</p>
	<p>一般來說，某些食物或會含有二噁英和二噁英樣多氯聯苯，但含量不會引起急性不良影響。二噁英和二噁英樣多氯聯苯是脂溶性的，不易分解，因此多積聚在脂肪組織，長遠有機會對健康構成不良的影響。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在訂定有關健康參考值(例如每月可容忍攝入量)時都會參考長期攝入有關污染物的實驗數據。</p> <p>In general, some foods may contain dioxins and DL-PCBs; however, the concentrations will not cause acute adverse effects. Nonetheless, dioxins and DL-PCBs are lipophilic and persistent and tend to accumulate in fatty tissues. They may have adverse effects on human health in the long-term. When establishing the health-based guidance value (e.g. Tolerable Monthly</p>

	Intake) for the contaminants, the Joint Food and Agriculture Organization / World Health Organization Expert Committee on Food Additives (JECFA) has taken experimental data on long-term intake of these contaminants into consideration.
10	<p>如果食物中的二噁英和二噁英樣多氯聯苯水平超出行動水平也不表示對健康有即時危害，那如何界定有關食物的進食風險？</p> <p>If the levels of dioxins and DL-PCBs in food exceed their corresponding action levels do not represent an immediate health hazard, then how could the risks of the concerned foods be assessed?</p>
	<p>慢性毒性方面，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為二噁英和二噁英樣多氯聯苯訂下的暫定每月可容忍攝入量為每月每公斤體重七十皮克毒性當量。暫定每月可容忍攝入量是指個人於一生中，每月可攝取某一種有毒物質而不致對健康構成可見風險的分量(按體重而定)，重點在於考慮到有毒物質可在身體內積聚和人一生的攝入量。只要平均攝入量並非長期超出這一數值，偶然短期攝入高於暫定每月可容忍攝入量的分量也不會影響健康。</p> <p>As regards chronic health effects, the Joint Food and Agriculture Organization / World Health Organization Expert Committee on Food Additives (JECFA) have established a Provisional Tolerable Monthly Intake (PTMI) of 70 µg WHO-TEQ/ kg bw per month for dioxins and DL-PCBs. PTMI is the amount of a toxic substance, expressed on body weight basis, which an individual may ingest monthly over a lifetime without appreciable risk to health. It takes the accumulation of the toxic substance in the body into consideration and stresses on lifetime exposure. Occasional short-term exposure above the PTMI would have no health consequences provided that the average intake over long period is not exceeded.</p> <p>如果從膳食攝入二噁英和二噁英樣多氯聯苯長期持續高於上述健康參考值，因攝入有關污染物的健康風險便不能排除。</p> <p>However, if the dietary exposure to dioxins and DL-PCBs persistently exceeded the above health-based guidance value for prolonged period, the adverse health risk associated with the pollutant could not be excluded.</p>
11	就今次驗出二噁英和二噁英樣多氯聯苯的大閘蟹樣本而言，中心如何評估有關的進食風險？

As regards the detection of dioxins and DL-PCBs in the samples of hairy crabs, how does the Centre for Food Safety assess the risk of eating the concerned hairy crabs?

今次在進口層面抽取的兩個大閘蟹樣本，被檢出二噁英和二噁英樣多氯聯苯含量為每克食物 11.7 和 40.3 皮克毒性當量。

The two hairy crab samples collected at import level were detected with dioxins and DL-PCBs at levels of 11.7 and 40.3 pg/g TEQ.

以上述二噁英及二噁英樣多氯聯苯較高含量的樣本進行的風險評估顯示，一般進食不會對健康構成即時風險或急性中毒。

Risk assessment on the sample with a higher level of dioxins and DL-PCBs indicated that consumers are unlikely to experience immediate adverse health effect or acute toxicosis upon usual consumption.

至於慢性毒性方面，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(專家委員會)為二噁英和二噁英樣多氯聯苯訂下的暫定每月可容忍攝入量為每月每公斤體重七十皮克毒性當量。

Regarding chronic toxicity, the Joint Food and Agriculture Organization / World Health Organization Expert Committee on Food Additives (JECFA) has established a provisional tolerable monthly intake (PTMI) of 70 pg/kg of body weight (bw) / month TEQ.

就每克大閘蟹含四十點三皮克毒性當量的樣本而言，風險評估顯示在扣除本底暴露值後，一個體重六十公斤的一般人如在該年的大閘蟹季節進食約十四隻有關大閘蟹（每隻四兩重計），便會超出專家委員會所訂下的暫定每月可容忍攝入量。至於二噁英和二噁英樣多氯聯苯暴露量偏高的消費者，如在該年的大閘蟹季節進食約三隻有關大閘蟹（每隻四兩重計），就會超出暫定每月可容忍攝入量。

After taking the background exposure level into account, risk assessment on the sample with dioxins and DL-PCBs at 40.3 pg/g TEQ showed that average consumers of 60 kg body weight can consume 14 hairy crabs (4 taels/pcs) in the hairy crab season in a year without reaching the PTMI. In the case of high consumers, their dietary exposure would exceed the PTMI

	<p>if they consume 3 hairy crabs (4 taels/pcs).</p> <p>要注意的是，只要平均攝入量並非長期超出健康參考值，偶爾短期攝入高於暫定每月可容忍攝入量的分量也不會影響健康。同時，個別食物縱使超出二噁英和二噁英樣多氯聯苯的行動水平，也不表示對健康有即時危害。</p> <p>It should be highlighted that the transient excursion above the PTMI would have no health consequences provided that the average intake does not continuously exceed the health-based guidance value. Also, mere exceedance of action levels of dioxins and DL-PCBs in a food sample does not necessarily imply acute health risk.</p>
1 2	<p>如何從膳食中減低攝入二噁英和二噁英樣多氯聯苯的風險？</p> <p>How can the dietary exposure to dioxins and DL-PCBs be reduced?</p>
	<p>防止攝入過量二噁英和二噁英樣多氯聯苯應從環境控制着手。我們應採取源頭控制措施，預防和減少人體的攝入量。國際社會應致力減少二噁英的排放和對食物造成的污染，這一點對減少人體從膳食攝入二噁英和二噁英樣多氯聯苯十分重要。</p> <p>Prevention and reduction of human exposure should be done through source-directed measures. International efforts in the reduction of dioxins and DL-PCBs emission and their subsequent contaminations of food are essential to reduce the dietary exposure to dioxins and DL-PCBs of the population.</p> <p>市民應去掉肉類的脂肪和食用低脂奶類製品，並應保持均衡及多元化的飲食，包括進食多種蔬果，避免因偏食某幾類食物而攝入過量的二噁英和二噁英樣多氯聯苯。魚類含有如奧米加-3 脂肪酸、優質蛋白質等多種人體所需的營養素，市民宜適量進食多種魚類。</p> <p>The public is advised to trim fat from meat and consume low fat dairy products. The public is also advised to have a balanced and varied diet which includes a wide variety of fruit and vegetables so as to avoid excessive exposure to dioxins and DL-PCBs from a small range of food items. As fish contain many essential nutrients, such as omega-3 fatty acids and high quality proteins, moderate consumption of a variety of fish is recommended.</p>

發育中的胎兒對二噁英最為敏感。新生兒的器官系統迅速發育，也可能更易受到一定影響。懷孕和授乳母親可將污染物傳到胎兒和餵哺中的嬰兒。根據世界衛生組織，上述減低人體的二噁英及二噁英樣多氯聯苯含量的長遠策略，對女童及年輕女性來說，應是至關重要，可減少日後懷有胎兒和為嬰兒餵哺母乳時攝入二噁英及二噁英樣多氯聯苯的分量。孕婦、授乳母親和兒童亦應特別注意相關的飲食建議。

The developing fetus is most sensitive to dioxin exposure. Newborn, with rapidly developing organ systems, may also be more vulnerable to certain effects. Pregnant women and lactating mothers can pass the contaminants to their unborn and nursing babies. According to World Health Organization, the above mentioned long-term strategy to reduce body burdens is probably most relevant for girls and young women to reduce exposure of the developing fetus and when breastfeeding infants later on in life. Pregnant women, lactating mothers and children should also pay particular attention to the relevant dietary advice.

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