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

二零一八年十一月 · 第一百四十八期
Nov 2018 • 148th 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

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編輯委員會 EDITORIAL BOARD

焦點個案 *Incident in Focus*

淡水魚刺身的食物安全
Food Safety of Freshwater Fish Sashimi

食物安全中心獸醫公共衞生組
漁業主任鍾偉祺博士報告

Reported by Dr. Terence CHUNG, Fisheries Officer, Veterinary Public Health Section, Centre for Food Safety

最近有人討論，虹鱒(學名*Oncorhynchus mykiss*)是否可以稱為「三文魚」，理由是虹鱒與大西洋三文魚一樣，同屬「鮭科」魚類。與此同時，本地有電視節目向觀眾推介鯇魚魚生。這兩宗事件令市民關注到淡水魚刺身的食物安全。

Recently, there were discussions on whether rainbow trout (Scientific name *Oncorhynchus mykiss*) can be named "Salmon" as it belongs to the same scientific category of "salmonidae" fish, just like Atlantic salmon. Meanwhile, a local TV programme introduced the Carp Yu Sang dishes as a delicacy. These two incidents have given rise to public concern on the food safety of freshwater fish sashimi.

魚源性寄生蟲可感染人類

魚源性寄生蟲在海魚及淡水魚中均屬常見。一些魚源性寄生蟲可感染人類，例如線蟲及吸蟲。海魚中常見的線蟲有異尖線蟲，至於屬吸蟲的中華肝吸蟲(圖1)則常見於淡水鯇魚及相關品種。中華肝吸蟲病盛行於東南亞及東亞地區。近日有文獻指出，東亞地區感染中華肝吸蟲病的患者估計約有1500萬人，其中1300萬人在中國*。

圖1：顯微鏡下的中華肝吸蟲
(資料來源：香港大學微生物學系助理教授(臨床)黃世賢醫生)
Figure 1: Clonorchis sinensis under microscope.
(Source: Dr. Samson SY. WONG, Assistant Professor (Clinical), Department of Microbiology, HKU)

魚源性寄生蟲的生命周期複雜，涉及多個中間宿主。不巧的是，一些商業價值高的魚，例如鯇魚，正是這些寄生蟲的中間宿主。在飼養過程中，這些魚類可能透過受污染的環境或投餵的飼料，吃下寄生

Fish Borne Parasite Can Infect Human

Fish borne parasites are common in both marine and freshwater fish. Some of these fish borne parasites can infect human, e.g. Nematodes and Trematodes. Anisakis is a common Nematode in some marine fish while the Chinese liver fluke (a Trematodes, *Clonorchis sinensis*) (Figure 1) is commonly associated with freshwater carp and related species. Chinese liver fluke is an endemic problem in Southeast and East Asia. A recent paper estimated some 15 million people are infected with Chinese liver fluke in East Asia, of which 13 million are in China*.

Fish borne parasites have complex life cycles, involving multiple intermediate hosts. Unfortunately, some commercially important fish, e.g. carp, are intermediate hosts to these parasites. During rearing these fish, they may

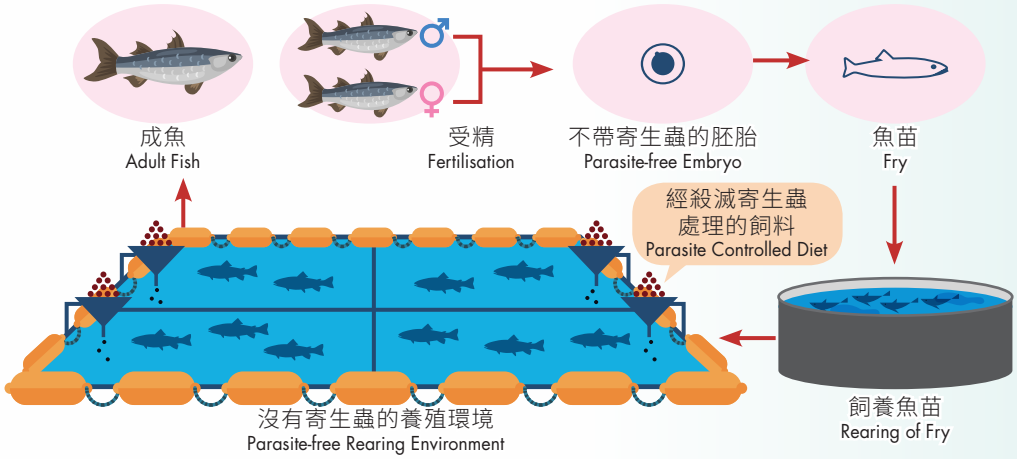

圖2：良好的水產養殖方法可以降低寄生蟲感染的風險
Figure 2: Good aquaculture practice can reduce the risk of parasite infestation.

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焦點個案
Incident in Focus

蟲的卵或包囊。人類生吃或未有煮熟而進食這些帶有寄生蟲的魚類，便會受到感染。

良好的水產養殖方法可大幅降低寄生蟲感染的風險

挪威等一些歐洲國家已發展出專門的水產養殖方法，推行養殖魚類的寄生蟲防控措施(圖2)。歐洲聯盟(歐盟)已認可在沒有寄生蟲的環境中培殖胚胎和飼養，並以經殺滅寄生蟲處理(例如加熱處理)的飼料餵飼的養殖魚類，感染寄生蟲的風險大為降低。儘管如此，由於寄生蟲防不勝防，這些養殖魚類的產品仍須定期進行寄生蟲檢測。不過，東南亞地區養殖的魚類，例如鯪魚，一向以來並非在這種受監控的環境中飼養。

圖3：照片所見為食物投訴個案中懷疑帶有寄生蟲的魚生
Figure 3: A photo taken from a food complaint case of a suspected parasite found in raw fish.

透過冷藏殺死魚內的寄生蟲

為了處理魚類中的寄生蟲，歐盟與美國食品及藥物管理局規定，擬供生吃的魚類產品必須經過冷藏處理，以降低寄生蟲感染的風險。舉例來說，供生吃的魚類在出售前須冷藏於攝氏零下20度或以下7天，或攝氏零下35度約20小時。只有由受妥善監控的環境出產的魚類產品，才可獲豁免上述規定。

總括來說，要懂得如何選擇食用魚類產品的方式。不論是海魚或淡水魚，若養殖環境缺乏監控，或產品未有予以適當處理，都可能帶有寄生蟲(圖3)。進食生的魚類產品，會有感染寄生蟲病的風險。

注意事項：

1. 海魚及淡水魚均可能帶有多種寄生蟲。
2. 生吃魚類存有微生物風險。
3. 良好的水產養殖方法及冷藏處理可以大幅降低寄生蟲感染的風險。

給業界的建議

- 向進口商索取由來源國發出的官方衞生證明書。此外，只向在有監控的水產養殖環境中飼養魚類，並適當處理其產品(例如冷藏處理)的可靠供應商採購供生吃的魚類。
- 向食物環境衞生署領取相關的牌照／許可證，方可製作和／或售賣壽司及刺身。
- 切勿供應中國菜式—魚生。

給市民的建議

- 買魚時應光顧可靠的持牌店鋪。
- 高危人士，包括長者、幼童、孕婦及免疫力較低人士不宜生吃魚類。
- 要避免感染魚源性人畜共患寄生蟲病，最好把魚類產品妥為煮熟。

* MB Qian, J Utzinger, J Keiser and XN Zhou., 2016. Clonorchiasis. Lancet 387:800-10.

acquire eggs or cysts of the parasites through the contaminated environment or the feed they ingested. People will be infected when consuming raw or undercooked fish containing the parasites.

Good Aquaculture Practice Can Greatly Reduce the Risk of Parasite Infection

Some European countries such as Norway have developed special aquaculture practices to control parasite infestation in farmed fish (Figure 2). It has been accepted by the European Union that farmed fish cultured from embryo, fed with parasite-controlled diet (e.g. feed that has been heat-treated), and reared in parasite-free environment have a much lower risk of parasite infection. Nevertheless, these fishery products must still be inspected regularly for presence of parasites that somehow get their way to the farmed fish. However, fish such as carp cultured in Southeast Asia are not traditionally cultured in such controlled environment.

Killing Parasites in Fish by Freezing

To deal with parasites in fish, the European Union and the Food and Drug Administration (FDA) of USA require fishery products intended to be consumed raw to go through freezing treatment to reduce the risk of parasite infection. For example, fish intended for raw consumption should be frozen at –20°C or below for seven days or at –35°C for about 20 hours before sale. Only fish products produced from properly controlled environment are exempted.

To summarise, choose the way to eat fishery products wisely. If the fish, regardless of marine or freshwater, is not raised in controlled environment or the product is not treated properly, it may carry parasites (Figure 3). There is a risk of getting parasite infection from consuming raw fishery products.

Key Points to Note:

1. Both marine and freshwater fish may carry a variety of parasites.
2. There is inherent microbiological risk consuming raw fish.
3. Good aquaculture practice and freezing treatment can greatly reduce the risk of parasite infection.

Advice to the Trade

- Obtain an official health certificate issued by the country of origin from importers. Only source from reliable suppliers that farm their fish in controlled aquaculture environment and process their products properly (e.g. freezing treatment) for raw consumption.
- Obtain a relevant licence/permit from the Food and Environmental Hygiene Department for manufacturing and/or sale of sushi and sashimi.
- Do not serve Chinese dishes "Yu Sang".

Advice to the Public

- Purchase fish from reliable and licensed premises.
- Susceptible populations, including the elderly, young children, pregnant women and people with weakened immune systems are advised not to consume raw fish.
- The best way to avoid fish-borne zoonotic parasite infection is to cook fishery products properly.

* MB Qian, J Utzinger, J Keiser and XN Zhou., 2016. Clonorchiasis. Lancet 387:800-10.

食物安全平台
Food Safety Platform

工業生產的反式脂肪——心臟健康的雙料殺手

Industrially-Produced Trans Fats – A Double Jeopardy for Heart Health

食物安全中心風險評估組
科學主任林伏波博士報告

提起「反式脂肪」一詞，腦海中會浮現什麼畫面？人氣快餐店令人垂涎的酥皮忌廉湯？附近麵包店鬆脆多汁的牛肉芝士批？抑或是導致動脈栓塞的某類脂肪？在本文中，我們會探究何謂反式脂肪，特別是工業生產的反式脂肪如何對心臟健康造成雙重的禍害。

何謂反式脂肪？

反式脂肪屬於不飽和脂肪酸，在結構上含有至少一個反式雙鍵。反芻動物的肉及奶製品或含少量反式脂肪(最高可佔產品總脂肪含量6%)，這種反式脂肪是在反芻動物的腸道內形成的。然而，大部分反式脂肪(最高可佔產品總脂肪含量60%)是人工製成用以製造食品的脂肪，亦即工業生產的反式脂肪。圖例中的酥皮忌廉湯及牛肉芝士批，便可能同時含有這兩類反式脂肪(見圖4)。

何謂工業生產的反式脂肪？

大部分植物油在室溫下呈液體狀態，當油加入氫，經過氫化過程的油會變為接近固體狀態，可供塗抹。人造牛油或植物起酥油便可能含有這些部分氫化油。

部分氫化油有其商業及食品科技用途，可增進食品的色香味與口感，延長保質期，並更為耐受反覆加熱，使食品更加吸引。由於部分氫化油可經反覆加熱而不易分解，故非常適合用於油炸快餐食品、烘焙食品及加工零食。

工業生產的反式脂肪隱藏於哪些食物？

許多食品都含有工業生產的反式脂肪及部分氫化油。食物安全中心在二零零七年至二零一八年期間就本地食品的反式脂肪含量進行研究，檢測出含反式脂肪的食品有烘焙食品(例如麵包、蛋糕、曲奇餅)、油炸食品(例如薯條、炸雞、油條)，以及人造牛油類產品。經過多年來向業界提供支援和加強宣傳，成效漸見，業界已降低所生產食品的反式脂肪含量。

二零一二年進行的研究結果顯示，與過往的研究結果相比，研究所涵蓋的若干類別食品的反式脂肪平均含量已減少，減幅(例如麵包64%、蛋撻/批/酥皮餅42%及蛋糕27%)反映業界努力的成果。雖然部分食品已不含反式脂肪，但仍有其他食品含大量反式脂肪(例如牛角包、吞拿魚/咖喱酥)。參考外國經驗，把食品的反式脂肪含量大大減少是可行的，不過香港仍須努力求進，才可促使本地食品供應商停用工業生產的反式脂肪。

反式脂肪如何對心臟健康造成雙重禍害？

反式脂肪是對心臟及血管最壞的脂肪，影響血液內膽固醇水平。反式脂肪不單使「壞膽固醇」增加，亦同時減少「好膽固醇」。

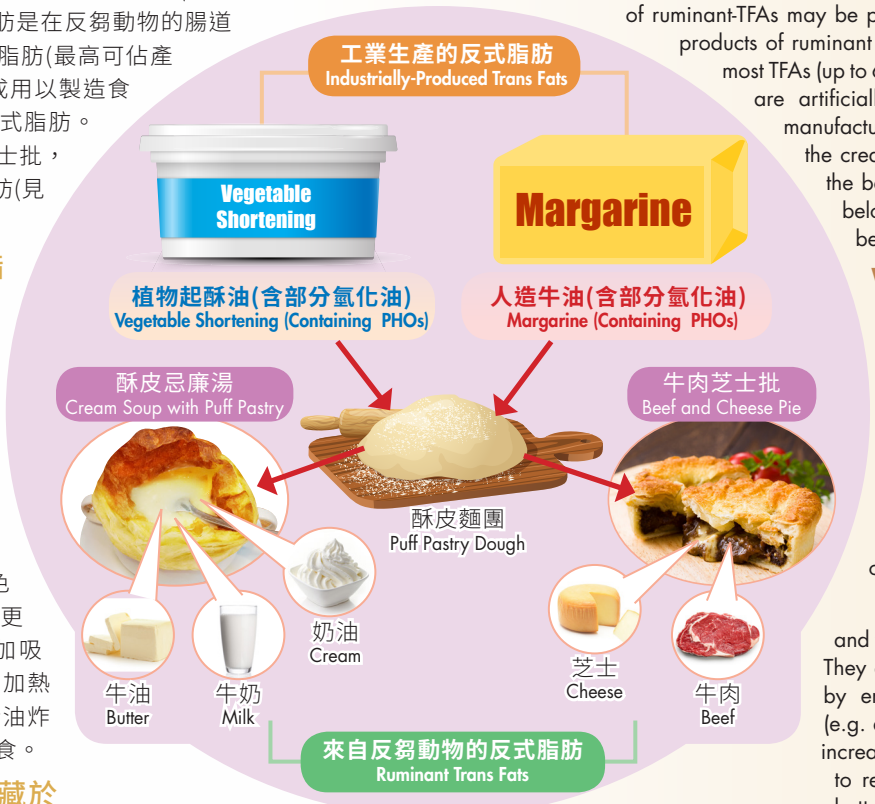

圖4：反式脂肪可能隱藏於加工食品，包括來自反芻動物的反式脂肪(通常少量)及工業生產的反式脂肪(大量，若使用的材料含部分氫化油)。

Figure 4: TFAs may be hidden in processed foods as R-TFAs (usually small amount) and IP-TFAs (large amount, if ingredients containing partially hydrogenated oils (PHOs) have been used).

Reported by Dr Violette LIN, Scientific Officer,
Risk Assessment Section, Centre for Food Safety

When the term "trans fats" (TFAs) is mentioned, what images surface in your mind? The lip-smacking cream soup with puff pastry from a popular fast food restaurant? The flaky yet juicy beef and cheese pie from the nearby bakery shop? Or some types of fat contributing to clogged arteries? In this article, let's get to the bottom of TFAs, especially how the industrially-produced TFAs (IP-TFAs) becomes a double trouble for your heart health.

What Are TFAs?

TFAs are unsaturated fatty acids consisting of at least one trans double bond. Although a small amount (up to 6% of a product's fat content) of ruminant-TFAs may be present in the meat and dairy products of ruminant animals formed in their guts, most TFAs (up to 60% of a product's fat content) are artificially created fats used in the manufacture of foods, i.e. IP-TFAs. In the cream soup with puff pastry and the beef and cheese pie examples below, both types of TFAs may be present (see Figure 4).

What Are IP-TFAs?

Most vegetable oils are liquids at room temperature. If hydrogen is added to oils through a process called hydrogenation, they become more solid, or 'spreadable'. Partially hydrogenated oils (PHOs) could be found in margarine or vegetable shortening.

PHOs have their commercial and food technological properties. They change the appeal of a food by enhancing its sensory profile (e.g. aroma, taste) and texture and increasing its shelf life and tolerance to repeated heating. PHOs can better withstand repeated heating without breaking down, making them ideal for frying fast foods, baking foods, and processing snack foods.

Where Are IP-TFAs Hidden in Your Food?

IP-TFAs and PHOs are found in a variety of food products. The Centre for Food Safety had conducted studies on TFAs contents in local foods between 2007 and 2018. TFAs are detected in bakery products (e.g. bread, cakes, cookies), deep fried food (e.g. French fries, fried chicken, fried fritters) and margarine/margarine-like spreads. After years of providing support to the trade and enhancing publicity, some benefits have been reaped as the trade have been producing food products with lower TFAs content.

The 2012 study comparing with the previous ones shows a reduction in the mean TFAs contents in some food categories covered. The reduction (e.g. 64% in bread, 42% in egg tart/pie/pastry and 27% in cake) reflects the positive effect of the trade's effort. While some products have reached the TFAs-free stage, others still have high TFAs level (e.g. croissants, tuna/curry puff pastries). Learning from overseas experience, it is feasible to reduce TFAs to a very low level in food but that there is still room for improvement if Hong Kong wants to eliminate IP-TFAs from the local food supply.

How Is Your Heart Health Doubly Jeopardised by TFAs?

TFAs are the worst type of fat for your heart and blood vessels through affecting

當體內的「壞膽固醇」過多，便會積聚在血管壁上形成斑塊，久而久之使血管內部收窄，阻礙血液流入和流出心臟與其他器官。動脈栓塞大大增加罹患心臟病、中風甚至死亡的機會。此外，反式脂肪引發炎症，導致血管內膜不能正常運作。上述問題全都損害心臟健康。相反地，「好膽固醇」能吸收膽固醇，並將之運送回肝臟以排出體外。

反式脂肪的攝取量應低至什麼水平？

根據世衛建議，工業生產的反式脂肪並非健康飲食的一部分，應該避免。反式脂肪的攝取量應限制為少於所需總能量的1%。以每天在膳食中攝取2000千卡能量為例，反式脂肪的攝取量應少於2.2克。

總括而言，工業生產的反式脂肪是食品及油脂中的人造有害化合物。反式脂肪可導致動脈栓塞，增加患上冠心病的風險。在下一期，我們會討論業界如何可以降低食品中工業生產的反式脂肪含量，以及消費者如何能減少攝取工業生產的反式脂肪。

your blood cholesterol levels. TFAs not only increase your "bad cholesterol", but also decrease the "good cholesterol".

When your body has too much "bad cholesterol", it can build up on the walls of your blood vessels to form plaque. Over time, the plaque narrows the insides of the vessels and blocks blood flow to and from your heart and other organs. Clogged arteries greatly increase the likelihood of heart attack, stroke, and even death. Furthermore, TFAs promote inflammation and cause the inner lining of blood vessels fails to function normally. All these will impair your heart health. Contrarily, "good cholesterol" absorbs cholesterol and carries it back to the liver for removal.

How Low Should the Intake of TFAs Go?

The WHO suggests that IP-TFAs are not part of a healthy diet and should be avoided. TFAs intake should be limited to less than 1% of total energy intake, which translates to less than 2.2 g per day in a 2,000 kcal diet.

In summary, IP-TFA is a man-made harmful compound found in foods, fats and oils. TFA can clog arteries and increases the risk of coronary heart disease. In the next issue, we will discuss how the trade could produce foods with lower IP-TFAs, and consumers could reduce the intake of IP-TFAs.

食物事故點滴
Food Incident Highlight

食物中的縮水甘油酯是新浮現的食物安全問題
Glycidyl Esters in Food is an Emerging Food Safety Issue

近年有海外研究顯示，在含有精煉植物油脂的食物中找到縮水甘油酯，例如人造牛油、烘焙和酥皮食品、煎炸食品、各類零食，以及嬰兒和較大嬰兒配方奶粉。縮水甘油酯是在提煉植物油的過程中進行脫臭步驟時形成，當攝入後會在人體內分解並釋出縮水甘油，國際癌症研究機構已將之列為可能致癌物。

縮水甘油酯的攝入量應維持在可合理做到的盡可能低水平。食品法典委員會現正草擬實務守則，涵蓋的措施適用於農務作業、榨油和煉油過程，以及食品中精煉油的來源和用途。二零一八年年初，歐洲委員會就一些指定食物訂定縮水甘油酯的最高含量，包括植物油脂、嬰兒和較大嬰兒配方奶粉。業界應留意和盡可能採購縮水甘油酯含量較低的油酯及食品。食物安全中心會繼續監察國際上的發展及本港情況。

In recent years, overseas studies revealed that glycidyl esters (GE) were found in foods containing refined vegetable fats and oils, such as margarine, bakery and pastry products, deep-fried products and various snack products as well as infant formula and follow-up formula. GE are formed during the deodorisation step in the refining of vegetable oils. After ingestion, GE are broken down in the human body to release glycidol which is probably carcinogenic according to the International Agency for Research on Cancer.

The intake of GE should be kept as low as reasonably achievable. The Codex is now developing a Code of Practice which includes measures applicable to agricultural practices, oil milling and refining processes, source and use of the refined oils in food products. In early 2018, the European Commission set maximum levels of GE in some specified foods including vegetable fats and oils, infant formula and follow-up formula. The trade should take note and source fats/oils and food products with lower GE levels where possible. The Centre for Food Safety will continue monitoring the international development and local situation.

戊型肝炎與食物安全
Hepatitis E and Food Safety

近日前後兩名免疫力減弱的病人確診患上戊型肝炎，並驗出帶有老鼠戊型肝炎病毒。據報此病的傳播可能與老鼠有關。戊型肝炎可經糞口途徑傳播，主要媒介為受污染的食物和水。在二零一零年至二零一四年期間，香港每年的戊型肝炎呈報個案約有一百宗。此病也可經食物途徑傳播，成因是未有適當加熱便吃下受感染動物的肉、內臟或其肉類製品。

為了預防感染戊型肝炎，必須保持良好的食物衞生習慣，例如把食物徹底洗淨和煮熟，生熟食物要分開處理。妥善貯存和蓋好食物，可減低受老鼠污染的風險。此外，應奉行良好的個人衞生習慣，例如在調製食物和用餐之前以肥皂洗手。

Recently, two immunocompromised patients were diagnosed separately suffering from Hepatitis E with rat Hepatitis E virus detected. It was reported that rat might be associated with the disease transmission. Hepatitis E can be transmitted by faecal-oral route mainly via contaminated food and water. There were about a hundred of cases of Hepatitis E per year reported in Hong Kong from 2010 to 2014. Foodborne transmission is a possible means which can be caused by the ingestion of meat, offals or meat products from infected animals without proper heat treatment.

To prevent Hepatitis E infection, it is important to maintain good food hygiene practice such as cleaning and cooking food thoroughly as well as handling raw and cooked food separately. Proper storage and coverage of food can reduce the risk of contamination by rats. In addition, good personal hygiene should be observed like washing hands with soaps prior to food preparation and before meals.

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