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食物中的蘇丹紅 Sudan Dyes in Food

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聯合報告

Reported by Ms. Joey KWOK and Mr. Arthur YAU,

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背景

二零零六年十一月十三日，中國中央電視台報道有人將非准許染色料蘇丹紅四號用於鴨飼料中，以求令蛋黃顏色更為艷紅。內地當局和食物安全中心(中心)分別展開跟進調查，發現部分鴨蛋和雞蛋樣本含蘇丹紅。事件引起全港市民關注。食物中濫用蘇丹紅絕非前所末聞的新事。近年英國亦有相關報道。在該事件中，英國食物標準局在二零零三年七月首度就受蘇丹紅一號污染的辣椒和辣椒製品發出食物警報和回收有關產品，其後多次發出食物警報和回收不同產品。二零零五年二月，問題變得白熱化。喼汁及其他醬汁、湯類和預製食品等多款食物因使用受污染辣椒和其製品作配料而驗出含有這種非准許染色料，一共約有600款食物被回收。

什麼是蘇丹紅？

蘇丹紅是一組工業染色料，當中包括蘇丹紅一號、二號、三號和四號等數種紅色染料。國際癌病研究組織在一九八七年就蘇丹紅一號、二號、三號和四號的安全作出評估，認為其在令人類患癌方面屬於未能界定類別。雖然有證據顯示蘇丹紅可能令實驗室動物患癌和影響基因，但目前並無足夠證據證明會令人類患癌。

根據《食物內染色料規例》(第132H章)，在本港不得在食物中使用蘇丹紅作染色料。中國內地和其他國家(包括歐盟成員國、澳洲和加拿大等)的食物法例亦有同樣規定。

根據有問題食品內所驗出蘇丹紅含量的現有資料所作出的風險評估顯示，按一般食用量進食蛋類，對健康產生嚴重影響的機會並不大。市民無須過分擔心。不過，對於經常進食極大量蛋類的人士，其健康風險會較高。

為什麼在食物中使用蘇丹紅？

在辣椒和辣椒製品個案中，污染源頭是產自印度的辣椒粉攪有雜質，相信加入蘇丹紅一號是為了增加和保持產品的顏色。辣椒粉的價格與其顏色的深淺和能否持久保持大有關係。事實上，蔬菜產品的顏色會隨時間變淡，日子久了產品對消費者的吸引力可能會下降。

至於蛋類個案中，消費者較喜歡金黃色的蛋黃，尤以鴨蛋為甚。相信蘇丹紅用於有關禽鳥飼料中是為了增加蛋黃的顏色。現時，有多種為人接受的飼養方法可達到此一目的，當中較常用的是控制飼料成分，例如在雞飼料中加入黃色玉米等大量橙黃色植物或

Background

On 13 November 2006, the China Central Television reported that non-permitted colouring matter Sudan IV was used in duck feeds to enhance the colour of egg yolks. Follow-up investigations carried out by Mainland authorities and the Centre for Food Safety (CFS), respectively, revealed that Sudan dyes were present in some duck and hen egg samples. The incident has raised territory-wide concerns. The abuse of Sudan dyes in food is not something new; it has been reported in the United Kingdom (UK) relatively recently. In that incident, the UK Food Standards Agency issued its first food alert and the related product recall in July 2003 regarding Sudan I - contaminated chilli and chilli products; subsequent updates on food alert and product recall had followed. The problem reached a climax in February 2005, when the non-permitted dye was detected in a much wider range of food products (such as Worcester and other sauces, soups, ready meals) using the contaminated chilli and products thereof as part of the ingredients; a total of nearly 600 food products were recalled.

What are Sudan Dyes?

Sudan dyes are a group of industrial dye consisting of a number of red colours (e.g., Sudan I, II, III and IV etc). The International Agency for Research on Cancer evaluated the safety of Sudan I, II, III and IV in 1987 and considered that they were unclassifiable as to their carcinogenicity to humans. Although there is some evidence that Sudan dyes may cause cancer in experimental animals and may cause damage to the genes, there is currently inadequate evidence that they cause cancer in humans.

The use of Sudan dyes as colouring matters in food is not permitted in Hong Kong under the Colouring Matter in Food Regulations (Cap.132H), nor the food legislations in Mainland China and in other countries including members of the European Union (EU), Australia and Canada.

Based on the available information regarding the levels of Sudan dyes found in the affected food products, risk assessment suggested that usual consumption of the affected products is unlikely to pose a significant health effect and there should be no cause for undue concern. However, the health risk would be greater for people who frequently eat extremely large amounts of those affected products.

Why Sudan Dyes are Used in Food?

In the case of chilli and chilli products, the contamination was traced back to adulterated chilli powder originated from India. It was suspected that Sudan I was fraudulently used to enhance and maintain the colour of the product. The price of

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Incident in Focus

在鴨飼料中加入大量甲殼類動物和魚類。此外，亦可在禽鳥飼料中使用一些獲准的顏色添加劑，而加麗紅就是其中一種較常用的顏色添加劑。加麗紅是化學物，含有名為角黃素的橙紅色胡蘿蔔素。角黃素在菌類、甲殼類動物、魚類、綠色海藻和蛋類中自然存在，歐盟成員國、加拿大和內地等多國均准許在禽鳥飼料中用作顏色添加劑。

未來工作

中心現正與內地當局緊密合作，並正檢討現行法例，以期作出修訂，加強規管蛋類及其製品的進口與分銷。另一方面，中心會在食物監察計劃下繼續留意食物中非法使用蘇丹紅的問題，並適時向市民發放有關結果。

給業界的建議

1. 向符合本港規定而又信譽良好的生產商和進口商採購產品。
2. 對購入的配料及／或製成品實施品質檢查，並在有需要時進行化驗，以確保出售的食物不會含蘇丹紅。
3. 保存良好的記錄制度，以便在有需要時追查來源和回收食品。

給消費者的建議

1. 根據有問題食品內所驗出蘇丹紅含量的現有資料，按一般食用量進食蛋類，對健康產生嚴重影響的機會並不大。市民無須過分擔心。
2. 保持均衡飲食，以免因偏食少種類食物以致攝入過量污染物或添加劑。

更多資料

如欲獲得更多資料，請瀏覽下列網頁：

- [中心編製有關食物中的蘇丹紅的風險簡訊](#)；以及
- [中心發出的新聞公報](#)。

chilli powder is largely linked to the intensity of the colour and its maintenance. Indeed vegetable products lose their colour over time and thus may become less appealing to consumers after some time.

In the case of eggs, consumers tend to prefer golden-yellow egg yolks, particularly so for duck eggs. It was suspected that Sudan dyes were used in respective poultry feeds to enhance the colour of the yolks. The above purpose, however, can be achieved through a number of acceptable husbandry practices. The more common one is the manipulation of feed composition, for instances, by including plenty of yellow-orange coloured plant materials such as yellow-corn into the hen feed, or including plenty of crustaceans and fish into the duck feed. Furthermore, a number of approved colour additives are also permitted for use in poultry feeds; Carophyll Red is one of the more frequently used ones. Carophyll Red is a chemical which contains an orange-red carotenoid pigment called canthaxanthin. Canthaxanthin is found naturally in food such as mushroom, crustacean, fish, green algae and egg; and is permitted for use in poultry feeds as a colour additive in many countries including members of the EU, Canada and the Mainland.

Way Forward

Working closely with the Mainland authorities, the CFS is in the process of reviewing the existing legislation with a view to making amendments to strengthen control on the import and distribution of eggs and their products. On the other hand, the CFS will continue to monitor illegal use of Sudan dyes in food under the Food Surveillance Programme, and release the findings to members of the public in an open and timely manner.

Advice to the Trade

1. Procure products from reputable manufacturers and exporters complying with local requirements.
2. Implement quality audits on incoming materials and/or end products, and to conduct laboratory analysis as appropriate, to ensure that the food products they sell do not contain any Sudan dyes.
3. Maintain a good recording system to facilitate back-tracing and recall if necessary.

Advice to the Consumers

1. Based on present information regarding the levels of Sudan dyes found in affected food products, usual consumption of the products is unlikely to pose a significant health risk. There is no cause for undue concern.
2. Maintain a balanced diet to avoid excessive exposure to contaminants or additives from a small range of food items.

Further Information

Readers may obtain further information from the following websites:

- [The CFS Risk in Brief on Sudan Dyes in Food](#); and
- [The CFS press releases](#).



兩個驗出含有蘇丹紅的咸鴨蛋樣本
Two salted duck egg samples found to contain Sudan dyes

風險傳達
工作一覽
Summary of
Risk Communication Work

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食物中的化學物質：食物添加劑概論

Chemicals in Food: Overview of Food Additives

食物安全中心風險評估組
科學主任邱頌韻女士報告

Reported by Miss Joan YAU, Scientific Officer,
Risk Assessment Section, Centre for Food Safety

當大家看“減肥”可樂汽水標籤上的成分表時，可能會發現“甜味劑、色素、防腐劑”等字眼。這些物質就是我們日常可能遇到的食物添加劑例子。

When you read the ingredient list in the label of a “light” cola drink, you may find “...sweetener, colour, preservative...”. These are examples of food additives we may encounter daily.

成分：碳酸水，調味劑，色素(150d)，酸度調節劑(338)，甜味劑(952, 950, 951)，防腐劑(211)，咖啡因

Ingredients: Carbonated Water, Flavour, Colour (150d), Acidity Regulator (338), Sweeteners (952, 950, 951), Preservative (211), Caffeine



何謂食物添加劑？

食物添加劑指在食物加工處理、包裝、運送或貯存過程中，為達到某種技術用途而刻意添加於食物內的任何天然或人造物質。現時，食物添加劑按不同作用可分為20多類，數量超過2 000種。市面上大部分預先包裝食物均含有一種或以上的食物添加劑。

What are Food Additives?

Food additive refers to any substance, either natural or synthetic, intentionally added to food for a technological purpose in the processing, packaging, transport or storage of such food. There are currently some 20 functional classes, with over 2 000 different kinds of food additives. Majority of prepackaged foods available on the market contain one or more kinds of food additives.

食物添加劑的技術用途

Technological purposes of food additives

例子	功能
染色料 (例如日落黃)	在食物中增添顏色
防腐劑 (例如飲料中的苯甲酸，醬料中的山梨酸，香腸中的二氧化硫)	抑制由微生物引致的食物腐壞，從而延長食物的保質期
甜味劑 (例如口香糖中的天冬酰胺)	在食物中增添甜味的一種非糖類的物質
抗氧化劑 (例如食油中的丁基羥基甲苯)	防止酸敗

Example	Function
Colouring matter (e.g. sunset yellow FCF)	To add colour to food
Preservative (e.g. benzoic acid in soft drinks, sorbic acid in sauces, sulphur dioxide in sausages)	To extend the shelf-life of a food by inhibiting spoilage caused by microorganisms
Sweetener (e.g. aspartame in chewing gum)	A non-sugar substance that imparts sweetness to a food
Antioxidant, e.g. BHT in oil	Prevent rancidity

食物添加劑是古已有之的東西。人們在中世紀已利用含亞硝酸鹽為活性成分的“硝石”保存肉類，減少微生物污染和降低患病的機會。時至今日，人們改用亞硝酸鹽保存各種肉類和保持肉色紅潤。

Food additives are not something new. People in the Middle Ages used “Saltpetre”, which contained nitrite as an active ingredient, to preserve meat. It helps reduce microbial contamination and the chance of causing illnesses. Nowadays, nitrite is used instead to preserve various meat products and to fix their pink colour.

隨着貿易全球化和食物加工處理的出現，食物添加劑的應用在提供世界各地安全健康的食物以滿足消費者需要方面十分重要。

With the globalization of trade and the advent of food processing, the application of food additives plays an important role in providing a variety of safe and wholesome food from different parts of the world to meet the consumers' need.

食物添加劑安全嗎？

一般而言，食物添加劑應使用能達到所需技術用途的最低分量。由於大部分預先包裝食物都含有食物添加劑，因此我們會從日常飲食中攝入各式各樣的添加劑。此類物質在食物安全方面的主要關注，是長遠而言人們的攝入量會否超出安全參考值。

Are Food Additives Safe?

Generally speaking, food additives should be applied in a way such that minimum amount is added to achieve the desired technological effect. Since majority of prepackaged food contains food additives, we are exposed to different types of food additives during daily food consumption. The prime food safety concern of food additives is whether the amount you consume in the long run exceeds the [safety reference value](#).

在國際食物安全機關中，聯合國糧食及農業組織／世界衛生組織聯合食物添加劑專家委員會(專家委員會)專責蒐集和評估食物添加劑的科學數據，就經評估的食物添加劑訂定安全參考值。此外，又會就安全使用量提出建議。在制定食物中的食物添加劑最高准許使用量時，世界各地的食物當局會參考專家委員會的評估結果，並考慮該國本身的需要。

In the international food safety arena, the Joint Food and Agriculture Organization / World Health Organization Expert Committee on Food Additives (JECFA) is responsible for collecting and evaluating scientific data on food additives and allocating safety reference values to the food additives evaluated. JECFA also makes recommendations on safe levels of use. Food authorities worldwide will take reference from JECFA's evaluation and their local needs when setting maximum permitted levels of food additives in food.

一般而言，食物添加劑的毒性問題不大，按照“優良製造規範”正常用於食物中不會危害健康。即使食用的產品中有某種食物添加劑過量，也不一定意味健康受到威脅。在慢性健康影響方面，從食物中長時間攝入該食物添加劑的分量才是關鍵所在，因為長遠而言，平均攝入量可能沒有超出安全參考值。

Food additives are generally of low toxicological concern and their normal use in food in accordance with Good Manufacturing Practice does not represent a health hazard. Even if you consume a product with excessive use of certain food additive, it does not necessarily mean that your health is at risk. For chronic health effects, your overall dietary intake of that food additive over a long period of time is important, since your average intake in the long run may not exceed the safety reference value.



給業界的建議

在配製食物時，業界應遵守“優良製造規範”，避免濫用食物添加劑，並留意本港法例中有關使用和標示食物添加劑的監管規定。此外，亦可登入[專家委員會網頁](#)(只有英文版)，參考食物添加劑的安全評估結果和規格。

給市民的建議

市民應保持均衡飲食，以免因偏食少種類食物引致過量攝入食物添加劑。敏感人士(如哮喘病患者)可能會因攝入二氧化硫等某些食物添加劑而出現過敏反應。因此，應小心選擇食物。如有需要，可徵詢醫務專業人員的意見。

由二零零七年七月起，如果添加劑是某預先包裝食物中的配料，必須列明該添加劑的作用類別及其本身所用名稱或其在食物添加劑國際編碼系統中的識別編號。該系統已獲食品法典委員會用作識別食物標籤上的食物添加劑。市民如欲取得食物添加劑國際編碼系統的資料，請登入[食物環境衛生署網頁](#)。

Advice to the Trade

When formulating a food product, the trade is recommended to follow Good Manufacturing Practice and avoid abuse of food additives. The trade should also take note of the regulatory requirement under our local legislation on the use and labelling of food additives. For safety evaluation and specifications of food additives, the trade may refer to the website of the [JECFA](#).

Advice to the Public

The public is advised to take a balanced diet so as to avoid excessive exposure to food additives from a small range of food items. People with allergic conditions, such as asthma patients, may experience hypersensitive reaction due to certain kinds of food additives like sulphur dioxide and should be careful when selecting food. Advice from medical professionals may be sought when necessary.

Starting from July 2007, any additive constituting one of the ingredients of a prepackaged food shall be listed by both its functional class and its specific name or its identification number under the International Numbering System (INS) for Food Additives, which is adopted by the Codex Alimentarius Commission for identifying food additives on food label. The public may refer to the website of the [FEHD](#) for information on the INS for food additives.



海魚中的殘留硝基呋喃

二零零六年十一月，食物安全中心加強監察市面上多寶魚的殘留獸藥問題。在化驗的五個多寶魚樣本中，全部均驗出含硝基呋喃，有兩個同時驗出含孔雀石綠。

鑑於市民關注在本港出售的活魚整體情況，中心遂於十二月初再抽取多種海魚樣本作殘餘獸藥化驗。中心一共化驗了20個樣本，全部均沒有驗出孔雀石綠，但有三個樣本(包括黃魴、杉斑及老虎斑)驗出硝基呋喃。

硝基呋喃是一類化學物質，有廣泛的抗菌性，可用於人類和動物(包括魚類)上。海外研究顯示，此物質曾用於豬隻、禽鳥、蝦和魚類。硝基呋喃在食物中的主要關注是其會否令人類患癌，以及缺乏有關硝基呋喃代謝物的安全資料。雖然有證據顯示硝基呋喃可能令動物患癌，但沒有足夠證據證明會令人類患癌。多個國家(包括歐洲聯盟成員國、美國、加拿大、澳洲和中國內地)已禁止在食用動物中使用硝基呋喃。

根據問題海魚樣本中硝基呋喃殘留量的現有資料，按一般食用量進食魚類對健康構成的風險偏低。市民無須過份恐慌。市民應保持均衡飲食。

Nitrofurans Residues Found in Marine Fish

In November 2006, the Centre for Food Safety (CFS) stepped up surveillance on turbot found in local markets with regard to veterinary drug residues. Out of a total of five samples of turbot tested, all samples were found to contain nitrofurans whereas two samples were detected with malachite green.

In view of public concern over live fish as a whole available for sale in Hong Kong, the CFS further collected samples of a variety of marine fishes for analysis of veterinary drug residues in early December 2006. A total of 20 samples were examined; all the samples were free from malachite green. However, nitrofurans were detected in three samples (including pompano, flowery grouper and tiger grouper).

Nitrofurans are a family of chemical compounds which have broad-spectrum antimicrobial activities and can be used in both humans as well as animals including fish. Overseas studies showed that nitrofurans had been used in pigs, poultry, shrimps and fish. The main concern over nitrofurans in food is the carcinogenicity of these compounds and the lack of information regarding the safety of their metabolites. Although there is evidence suggesting that nitrofurans might cause cancer in animals, there is inadequate evidence that it can cause cancer in humans. Nitrofurans have been prohibited for use in food-producing animals in many countries including the members of the European Union, United States, Canada, Australia and Mainland China.

Based on present information regarding the levels of nitrofurans residues found in the affected marine fish samples, risk to health is low upon usual consumption of the fish. There is no cause for undue alarm. The public is advised to maintain a balanced diet.

淡水魚中的孔雀石綠

鑑於市民近日關注到食物中的殘留獸藥問題，中心遂加強監察市面上的淡水魚，看看是否含殘留孔雀石綠及其他獸藥。在化驗的17個桂花魚樣本中，有13個來歷不明的樣本驗出含孔雀石綠。中心一直就事件與內地當局緊密聯繫。

按照目前的行政安排，內地供港的淡水魚必須來自註冊魚場，並附有衛生證書。由於我們設立了註冊制度，故能有效追查問題魚類的來源。

孔雀石綠是人造染料，可將棉花和紙張等物料染色。由於它能有效消除真菌，世界各地的水產養殖業早於三十年代起曾經常用，以醫治魚類的寄生病、真菌和原生動物疾病。隱色孔雀石綠是其中一種孔雀石綠代謝物，會長時間存留在魚類組織內。自二零零五年八月修訂法例後，所有在本港出售的食物不得含孔雀石綠。

根據問題魚類樣本中的孔雀石綠及／或硝基呋喃類殘留量，按一般食用量進食問題魚類，對健康產生嚴重影響的機會並不大。市民應保持均衡飲食。

Malachite Green Found in Freshwater Fish

With the recent concern over veterinary drug residues in food, the CFS had stepped up surveillance on freshwater fish in local markets for the presence of malachite green (MG) and several other veterinary drug residues. Of 17 freshwater groupers tested, 13 from untraceable sources were found to contain MG. The CFS had maintained close liaison with the Mainland authorities over the issue.

Under the current administrative arrangement, freshwater fish exported from the Mainland to Hong Kong should come from one of the registered fish farms and should be accompanied with health certificates. With the registration system in place, the source of the affected fish could be effectively traced.

MG is a synthetic dye used to colour materials such as cotton and paper. It had been commonly used worldwide in aquaculture as early as 1930s because of its effective antifungal properties. It had been used for treating parasitic, fungal and protozoan diseases in fish. One of the MG metabolites, leucomalachite green, would persist in fish tissues for a long period of time. With the legislative amendments in place since August 2005, MG should not be present in any food sold in Hong Kong.

Based on the levels of MG and/or nitrofurans residues found in the affected fish samples, usual consumption of the affected fish is unlikely to pose significant health risk. The public is advised to maintain a balanced diet.