

食物安全焦點

Food Safety Focus



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本期內容 IN THIS ISSUE

焦點個案

蔬菜的硝酸鹽和亞硝酸鹽含量與嬰兒飲食

食物安全平台

再談營養標籤

食物事故點滴

罐頭午餐肉中的汞

風險傳達工作一覽

Incident in Focus

Nitrate and Nitrite in Vegetables and Infant Feeding

Food Safety Platform

More about Nutrition Label

Food Incident Highlight

Mercury in Canned Luncheon Meat

Summary of Risk Communication Work

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焦點個案 Incident in Focus

蔬菜的硝酸鹽和亞硝酸鹽含量與嬰兒飲食 Nitrate and Nitrite in Vegetables and Infant Feeding

食物安全中心

風險評估組

科學主任陳蓉蓉女士報告

Reported by Ms Melva CHEN, Scientific Officer,

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a.



b.



c.

硝酸鹽含量較高的蔬菜例子：莧菜 (a)；小棠菜 (b)；白菜 (c)

Examples of vegetables with high nitrate levels: Chinese spinach (a); Shanghai cabbage (b); Petiole Chinese cabbage (c).

硝酸鹽天然存在於環境四周和植物。蔬菜中的硝酸鹽可經細菌或酶作用轉化為亞硝酸鹽，而亞硝酸鹽可引致罕見的藍嬰綜合症。本文重點討論我們有關蔬菜的硝酸鹽和亞硝酸鹽含量的研究結果及建議。

Nitrate occurs naturally in the environment and plants. Nitrate in vegetables can be converted to nitrite by bacteria or enzyme actions. The resulted nitrite can cause the rare blue baby syndrome. This article highlights the findings and recommendations of our study on nitrates and nitrites in vegetables.

本港的藍嬰綜合症個案

二零零八和零九年，本港分別有一名八個月和一名六個月的嬰兒因進食家中製作的莧菜粥和白菜粥而患上藍嬰綜合症。兩名嬰兒在接受治療後已出院。藍嬰綜合症又稱為“正鐵血紅蛋白血症”，患者體內的血紅蛋白不能把氧氣帶到各身體組織，令皮膚和嘴唇發紫。由於嬰兒的消化系統及正鐵血紅蛋白還原酶系統尚未成熟，所以他們較易患上此症。

Local Cases of Blue Baby Syndrome

In Hong Kong, two infants, eight and six months old, were reported suffering from blue baby syndrome after consuming homemade congee mixed with Chinese spinach and petiole Chinese cabbage in 2008 and 2009 respectively. Both babies were subsequently discharged after treatment. The syndrome, also called methaemoglobinaemia, occurs when the haemoglobin is unable to carry oxygen to body tissues. The patients will have their skin and lips turned blue. Infants are more susceptible to it because of the immaturity of the digestive and methaemoglobin reductase systems.

部分葉菜的硝酸鹽含量較高

在研究中，我們發現經檢測的73種新鮮蔬菜樣本都有含量不一的硝酸鹽，而亞硝酸鹽含量則普遍偏低或只有微量。莧菜、小棠菜和白菜三種葉菜的硝酸鹽含量最高，平均含量每公斤超過3 500毫克。蕓薹屬（例如西蘭花及椰菜花）、豆類（例如荷蘭豆）、瓜菜／果菜類（例如番茄、節瓜及甜玉米）、塊根和塊莖類（例如甘筍及馬鈴薯）及莖類蔬菜（例如蘆筍及綠豆芽）等其他蔬菜的硝酸鹽含量較低，平均含量每公斤少於1 000毫克。整體而言，蔬菜的硝酸鹽和亞硝酸鹽含量不會對公眾健康構成即時風險，詳情見研究報告。

Certain Leafy Vegetables Contain Higher Nitrates

In the study, we found all 73 fresh samples of vegetables tested contained variable levels of nitrates while the nitrite levels were generally very low or negligible. Three types of leafy vegetables, namely Chinese spinach, Shanghai cabbage and petiole Chinese cabbage, contained highest levels of nitrate at a mean concentration exceeding 3 500 mg/kg. Brassica (e.g. broccoli, cauliflower), legume (e.g. snow pea), and fruiting vegetables (e.g. tomato, hairy gourd, sweet corn), root and tuber (e.g. carrot and potato), stalk and stem vegetables (e.g. asparagus, mung bean sprout) were relatively low in nitrate (mean concentration less than 1 000 mg/kg). On the whole, the nitrate and nitrite levels in vegetables were unlikely to pose immediate health risk to general population. Details can be found in the study report.

蔬菜的處理方法可影響硝酸鹽和亞硝酸鹽含量

我們可透過清洗和削皮減少蔬菜中已存在的硝酸鹽。由於硝酸鹽可溶於水，因此清洗和用水焯菜能減少硝酸鹽含量。馬鈴薯等蔬菜在去皮後，硝酸鹽

Handling of Vegetables Affects Nitrate and Nitrite Levels

For nitrates already exist in the vegetables, we can reduce the level by washing and peeling. Nitrate is soluble in water and thus washing and blanching of vegetables can reduce nitrate levels. Nitrate content was found to decrease significantly after peeling of vegetables such as potato. Our study also showed that the nitrate concentrations in Chinese



含量會大幅減少。研究又顯示，菜心、莧菜及西芹用水焯一至三分鐘後，硝酸鹽含量減少12%至31%。

另一方面，我們可採取一些措施防止蔬菜中已存在的硝酸鹽轉化為亞硝酸鹽。蔬菜的亞硝酸鹽含量增加是基於細菌或酶（硝酸鹽還原酶）發揮作用所致。新鮮蔬菜搗碎後，破損的蔬菜細胞會釋出酶，產生亞硝酸鹽。烹煮可破壞酶活性。不過，如蔬菜其後受細菌污染，亦會造成亞硝酸鹽累積。冷藏（攝氏零下18度或以下）可抑制亞硝酸鹽累積，但存放在一般雪櫃（約攝氏4度）則不然。至於商業加工的嬰兒食品，入罐程序必須經過消毒處理，這程序能有效殺死可產生亞硝酸鹽的微生物。不過，若這類食品一旦開封，如處理或貯存不當仍會受細菌污染。

注意要點

- 本港蔬菜的硝酸鹽和亞硝酸鹽含量不會對公眾健康構成即時風險。
- 妥善處理和貯存蔬菜可減少攝入硝酸鹽和亞硝酸鹽。
- 蔬菜對健康十分重要，應給嬰兒交替餵食各種包括葉菜的蔬菜。

嬰兒飲食中的蔬菜

蔬菜含有對健康十分重要的膳食纖維和其他營養素。世界衛生組織建議，嬰兒出生後首六個月以純母乳餵哺。如其後加入補充食物，六至十二個月嬰兒的蔬菜食用分量一般約為每天兩至四湯匙。另應給嬰兒交替餵食各種包括葉菜的蔬菜，以保持均衡營養。

有關為嬰兒配製含有蔬菜食物的建議

1. 小心配製
 - 馬鈴薯和甘筍等蔬菜，應清洗和削皮。
 - 如需切碎或磨碎蔬菜，應在烹煮前才進行。
 - 以沸水焯硝酸鹽含量高的蔬菜一至三分鐘，食用前應把水倒去。
2. 妥善貯存
 - 為嬰兒配製的菜粥及菜泥，應立即進食，最好不要貯存。
 - 如必須貯存，只可供下一餐食用（少於12小時），並應放進雪櫃（攝氏4度以下）。
 - 如需貯存超過12小時，應放在冷藏格（攝氏零下18度或以下）。
 - 如非即時烹煮，應把新鮮葉菜存放在雪櫃。
3. 立即食用
 - 嬰兒食物在配製後最好立即食用。
 - 已烹煮的食物經貯存在雪櫃或冷藏格，取出後應立即徹底煮沸並維持一分鐘，並應即時進食。

更多資料

1. 中心與衛生署合撰的《有關蔬菜的硝酸鹽／亞硝酸鹽含量與嬰兒正鐵血紅蛋白血症的醫護人員資訊》（只有英文版）
2. 《食物安全焦點》（二零零八年八月第二十五期）內《食物中的硝酸鹽》一文

flowering cabbage, Chinese spinach and celery reduced by 12% to 31% when they were blanched for one to three minutes.

On the other hand, we can take some measures to prevent accumulation of nitrites from the existing nitrates. Nitrite in vegetables is formed as a result of bacterial or enzyme (nitrate reductase) actions. When the fresh vegetables are pureed, the broken vegetable cells will release the enzyme for nitrite formation. Cooking can destroy the enzyme activity. However, any subsequent bacteria contamination can also result in nitrite accumulation. Nitrite accumulation is inhibited under frozen storage (at or below -18°C) but not in the usual refrigerators (about 4°C). For commercially processed infant food, the sterilization treatments necessary for canning can effectively destroy nitrite-forming microorganisms. However, once the container is opened, it is still subject to bacterial contamination if the food is not handled and stored properly.

Key Points to Note

- Nitrates and nitrites in local vegetables are unlikely to pose immediate health risk to the population.
- Proper handling and storage of vegetables can reduce nitrate and nitrite intake.
- Vegetables are essential for health and different types of vegetables including leafy vegetables should be given to infants in rotation.

Vegetables in Infant Feeding

Vegetables contain dietary fibres and other nutrients essential for health. For infants, World Health Organization recommends exclusive breastfeeding for those up to six months of age. When complementary foods are introduced, the usual quantity of intake for babies of 6-12 months old is around two to four tablespoons per day. Different types of vegetables including leafy vegetables should be given to infants in rotation to maintain balanced nutrition.

Advice for the Preparation of Vegetable-containing Foods for Infants

1. Prepare carefully
 - Wash and peel vegetables (e.g. potato, carrot, etc).
 - When chopping or mashing is required, do so shortly before cooking.
 - Blanch high-nitrate vegetables in boiling water for one to three minutes and discard the cooking water before consumption.
2. Store properly
 - Vegetable congee and puree prepared for infants should be consumed immediately and preferably not be stored at all.
 - If storage cannot be avoided, keep only for the next meal (less 12 hours) and in a refrigerator (below 4°C).
 - If storage for more than 12 hours is needed, the food should be kept in freezer (at or below -18°C).
 - Store the fresh leafy vegetables in refrigerator if they are not cooked immediately.
3. Eat it right away
 - It is most desirable to prepare the infant food immediately before consumption.
 - Cooked food taken out from the refrigerator or freezer should be reheated right away by boiling thoroughly for one minute and consumed immediately.

Further Information

1. "Message to Healthcare Colleagues on Nitrate/Nitrite in Vegetables and Methaemoglobinaemia in Infants" jointly developed by the CFS and Department of Health.
2. "Nitrate in Food" published in the 25th Issue of Food Safety Focus in August 2008.



再談營養標籤

More about Nutrition Label

食物安全中心
風險評估組
科學主任廖珮珊女士報告
Reported by Ms. Melissa LIU, Scientific Officer,
Risk Assessment Section,
Centre for Food Safety

我們在上期提到，營養聲稱是選擇食物時的快速有用參考，但營養標籤上的其他資料對選擇較健康食物亦十分重要。

全面了解

附有搶眼的低脂、低糖和低鈉聲稱的食物是否全部真的較健康呢？

簡單的回答就是“未必一定”。有些加上“低脂”或“高纖”等聲稱的產品可能是高鈉或高糖食物，並非我們想像那麼健康。有些產品即使符合有關特定條件，亦可能選擇不加上營養聲稱。因此，除了閱讀營養聲稱外，查看營養標籤，全面了解產品才作出選擇是明智的做法。

更多便利選擇的工具

事實上，消費者需要時間和知識才能看完整個營養標籤，掌握產品的全面營養含量去選擇食物。因此，近年各國紛紛推出不同措施，方便消費者選擇較健康的食物。

營養素參考值百分比

營養素參考值是專用於營養資料標籤制度的一組數值。營養素參考值百分比旨在說明相對特定的營養素參考值而言，食物中營養素含量的多寡。在本港，除了強制規定在營養標籤上標示能量和營養素的絕對值外，能量值和營養素的含量亦可進一步以有關數值與法例所述營養素參考值的比率(須為百分率)表達。考慮到本港的食物供應性質，業界亦可採用任何國家衛生當局或國際衛生當局採用的營養素參考值。消費者查看營養素參考值百分比，就可比較不同食品的营养素含量，粗略估計有關食物如何達到他們的營養需要。

指示標誌

即使標籤加上營養素參考值百分比，消費者仍需查看每種營養素的數值。因此有些國家採用指示標誌，例如在英國推廣的“交通燈標籤”。食物包裝的正面以紅、黃、綠三色標誌顯示有關食物的特定營養素含量屬於高、中或低，令消費者一目了然。從英國指引摘錄的附圖可見，消費者一看就知道加上這個標誌的食物是低脂及低飽和脂肪(綠)和高糖(紅)，而鈉含量則屬於中等(黃)。

In the last issue, we have learnt that nutrition claims are useful in making quick reference when choosing foods. However, other information on nutrition label is also important in making your healthier food choices.

Knowing the Full Picture

Are all foods with eye-catching nutrition claims of low fats, low sugars or low sodium are really healthier?

The simple answer is “not necessarily”. Some products with claims such as “low fat” could be high in sodium or sugars, not as healthy as we have thought. Some products may not choose to use nutrition claims even though they have met relevant specified conditions. Therefore, besides the nutrition claims, it is wise also to read the nutrition label which gives a more comprehensive picture of the product before making our choices.

More Tools for Easier Choice

In fact, it requires time and knowledge to choose food by reading though the whole nutrition label for the overall nutrient contents of products. Therefore, in recent years, many attempts have been made to facilitate consumers to choose healthier foods.

Percentage Nutrient Reference Values

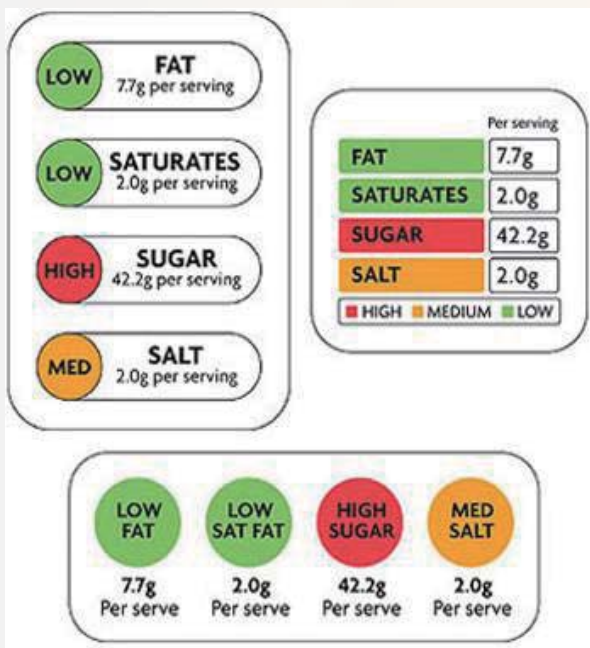
Nutrient Reference Values (NRV) are a set of figures developed for use in nutrition labelling system. Percentage values (%NRV) are to illustrate the product's nutrient amounts in relation to the NRV. In Hong Kong, apart from the mandatory declaration of absolute values of energy and nutrients on nutrition labels, energy and nutrient values may further be expressed as the ratio (as a percentage) of the values to the NRV listed in the law. Considering the nature of Hong Kong's food supply, the trade is also allowed to use NRV adopted by any national or international health authority. By reading the %NRV, consumers may compare the nutrient content in different foods and roughly estimate how the foods fulfill their nutritional needs.

Signposting

Still, labels with %NRV requires the consumers to look at the values for each nutrient. Therefore some countries use signposting to help consumers. The “traffic light labelling” promoted in the United Kingdom is an example. It shows consumers at-a-glance if a food has high, medium or low amounts of the selected nutrients by highlighting their levels in red, amber and green on the front of pack. In the example taking from the UK guidelines as shown, the consumer can quickly understand product with this sign is low in fat and saturated fats (green), high in sugar (red), and with a medium level of sodium content (amber).

Nutrient Profiling

Australia and some European countries have attempted to introduce another idea of “nutrient profiling” to help consumers. In simple terms, a food product is eligible for making nutrition claims provided it fits in a particular nutrient profile or overall nutritional status considered as “healthier”. For example, a product may only claim to be “low fat” if its other nutrients, such as sugars and sodium, exist in acceptable amounts. However, this system is complicated and there is still no international consensus on the methods and the application in regulatory control of nutrition claims.



英國的交通燈標籤例子 (資料來源: 英國食物標準局《有關包裝正面的交通燈標誌標籤的技術指引》(二零零七年十一月第二期)(只有英文版)

Examples of traffic light labels in the United Kingdom (Source: “Front-of-Pack Traffic Light Signpost Labelling Technical Guidance”, Issue 2, November 2007, Food Standards Agency, United Kingdom)

營養素度量法

澳洲和部分歐洲國家嘗試推出另一個方法“營養素度量法”來幫助消費者。簡單而言，食物須符合特定的營養成分組合模式或食物的整體營養狀況屬於“較健康”，才可作出營養聲稱，例如產品的糖及鈉等其他營養素含量必須在可接受水平才可作出“低脂”聲稱。不過，這個制度較複雜，現時國際間對於營養成分組合的制定和如何採用這個制度來規管營養聲稱方面仍未有共識。

邁向更健康的香港

在本港推行的營養資料標籤制度，提供了有利環境，推動業界研發更健康的食物和鼓勵消費者作更健康的選擇。幫助市民善用營養標籤上的資料是一項重點工作。為達到這個目標，我們參考營養素參考值百分比的概念為消費者製作了一套購物指南卡，又正研製其他相關資源。總的來說，我們希望讓市民享用不同種類食物而又能保持健康的均衡飲食。



中心製作的購物指南卡
Shopping guide cards produced by the CFS

Moving for a Healthier Hong Kong

The implementation of nutrition labelling scheme in Hong Kong provides a supportive environment for development of healthier foods and making healthier choices. Helping the public to make better use of the information is a priority. To this end, we have produced a set of shopping guides taking reference from the %NRV concept and are also developing other types of resource materials for consumers. After all, we hope to enable public to enjoy the variety of food while maintaining a balanced and healthy diet.

食物事故點滴
Food Incident Highlight

罐頭午餐肉中的汞

今年七月二十日，食物安全中心（中心）發出食物警報，提醒市民切勿進食一批“長城牌火腿豬肉”，因為中心收到一宗有關這款罐頭含銀色顆粒的食物投訴。測試結果證實有關顆粒屬於以液態存在的元素汞。經銷商為審慎起見自願回收有關批次的午餐肉。

汞（又稱“水銀”）是環境中的天然重金屬，以元素汞、無機汞和有機汞三種形態存在。無機汞和有機汞會損害健康，但元素汞則不會對健康造成重大影響，因為它不易被人體腸胃吸收。

在調查期間，中心抽取了23個跟進樣本進行測試，當中11個來自被驗出含水銀樣本的相同批次。結果顯示全部均不含水銀。

中心人員曾到位於河南省的廠房視察。中心注意到廠方的生產，是跟從一套經認證的食物安全管理系統和重點生產環節電子監控系統。中心亦注意到生產過程沒有使用或涉及水銀。

綜合調查的結果，中心認為在正常生產情況下，產品不會出現水銀。至於是次的問題是否涉及人為因素，中心至今未能作出有根據的結論。截至八月十日，中心再無收到其他有關該產品含水銀的投訴。中心會透過恆常監察計劃繼續留意情況。

Mercury in Canned Luncheon Meat

On 20 July 2010, the Centre for Food Safety (CFS) issued a food alert advising the public not to eat a certain batch of “Greatwall Brand Chopped Pork and Ham” as the CFS received a food complaint regarding silvery droplets found in the can. Test result confirmed that the droplets are elemental mercury, which occurs in liquid state. As a precautionary measure, the distributing agent voluntarily recalled the batch of luncheon meat concerned.

Mercury is a heavy metal that occurs naturally in the environment. It exists in elemental, inorganic and organic mercury forms. In contrast to inorganic and organic mercury which can cause adverse health effects, elemental mercury is unlikely to pose a significant health concern as it is poorly absorbed in the digestive tract.

During the investigation, the CFS collected 23 follow-up samples for tests, among which 11 were of the same batch as the sample found to contain mercury. Results indicated that all samples did not contain mercury.

CFS officers visited the plant in Henan Province. It was noted that there was an accredited system of food safety control and an electronic monitoring system for key production points. The CFS also noted that mercury was not used or involved in the manufacturing process.

Judging from all investigation results, the CFS concluded that mercury should not appear in the product under normal manufacturing conditions. As to whether human factor was involved in the incident, there was insufficient evidence for the CFS to arrive at any conclusion. Till 10 August, the CFS had not received any further complaint about the same product containing mercury. The CFS would continue to monitor the situation through regular surveillance.



問題罐裝午餐肉“長城牌火腿豬肉”的“此日期前最佳”日期為二零一三年一月十七日。

The affected canned luncheon meat “Greatwall Brand Chopped Pork and Ham” with “Best before date” as 17th January 2013.

風險傳達
工作一覽
Summary of
Risk Communication Work

風險傳達工作一覽 (二零一零年七月) Summary of Risk Communication Work (July 2010)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	72
公眾查詢 Public Enquiries	169
業界查詢 Trade Enquiries	694
食物投訴 Food Complaints	324
給業界的快速警報 Rapid Alerts to Trade	27
給消費者的食物警報 Food Alerts to Consumers	2
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	65
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	22