

食物安全焦點

Food Safety Focus



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Centre for Food Safety

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韓國即食麵中的苯並[a]芘 Benzo[a]pyrene in Korean Instant Noodles

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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上月底有傳媒報道六款韓國“農心”即食麵(包括烏冬)懷疑含致癌物苯並[a]芘。根據代理商提供的資料,其中五款在本港有售。食物安全中心(中心)即時作出跟進,於市面抽取了同一品牌在韓國製造的即食麵產品樣本作檢測。

苯並[a]芘的特性

苯並[a]芘是一種多環芳香族碳氫化合物(polycyclic aromatic hydrocarbons, 簡稱PAHs)。PAHs屬於一大類有機化學物質,含有兩個或以上稠芳香環。PAHs屬脂溶性,而從化學上來說,則呈穩定狀態。PAHs在環境中無處不在,空氣、土壤、水和食物都含有PAHs。有機物質的不充分燃燒及熱解會在食物中產生PAHs。

膳食所含的苯並[a]芘

幾乎所有食物都含有微量PAHs(未經烹煮的食物由每公斤0.01至0.1微克不等)。烘焗、燒烤、煙燻等加工食物的方法會產生PAHs。食物加工時的情況對產生多少PAHs(包括苯並[a]芘)也有影響。燒烤/煙燻肉類或魚類的PAHs含量通常較高(見表)。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)指出,穀類食物、蔬菜、脂肪和油類是攝入PAHs的主要膳食來源。

食物環境衛生署在二零零四年進行了一項有關PAHs的研究,目的是調查以不同方法烹煮的各種燒烤肉類(包括叉燒、燒肉、燒鴨三種燒味和肉乾)的PAHs含量。研究發現,食物的烹煮溫度越高,或食物距離熱源越近,其PAHs含量便越高。而在炭爐燒烤、氣體爐燒烤和電爐烘焗這三種烹製燒味的方法中,以用炭爐燒烤產生最多PAHs(見表)。

Late last month, media reported that six instant noodle products (including udon) of the Korean brand "Nong Shim" were suspected of containing benzo[a]pyrene (BaP), a human carcinogen. According to the local agent, five of them were available for sale in Hong Kong. The Centre for Food Safety (CFS) took follow-up action and collected samples of the products manufactured in Korea for testing.

Nature of BaP

BaP is a kind of polycyclic aromatic hydrocarbons (PAHs) which belong to a large group of organic chemicals containing two or more fused aromatic rings, are fat-soluble and chemically stable. PAHs are ubiquitous in the environment, being present in air, soil, water and food. They may also be formed in food during incomplete combustion or burning of organic matters.

Occurrence in the Diet

Almost all food contains PAHs at low levels (0.01 – 0.1 µg/kg in uncooked food). Food processing such as roasting, grilling, barbecuing and smoking generates PAHs. Levels of PAHs, including BaP may vary depending on the processing conditions and are often higher in barbecued/smoked meat or fish (see Table). According to the Joint FAO/WHO Expert Committee on Food Additives (JECFA), cereals, vegetables, and fats and oils are major contributors to dietary exposure to PAHs.

The Food and Environmental Hygiene Department conducted a study on PAHs in 2004, aiming to investigate PAH levels in barbecued meat (including three kinds of siu mei, namely BBQ pork, roasted pork and roasted duck, and dried meat) prepared in different ways. It revealed that the higher the cooking temperature or the closer the distance from the heat source, the more PAHs were generated, and that charcoal grilling gave rise to more PAHs in foods than gas grilling and electric oven roasting (see Table).

各種加工肉類/魚類的苯並[a]芘含量一覽表 Table: BaP levels in various processed meat/fish

食物 Foods	苯並[a]芘含量 (微克/公斤) Reported BaP levels (µg/kg)	
	平均值/中位數 Mean/Median	最高 Highest
本港數據 Local data		
叉燒(炭爐燒烤)* BBQ pork (charcoal grilled)*	0.8	5.3
燒肉(炭爐燒烤)* Roasted pork (charcoal grilled)*	1.5	3.2
燒鴨(皮及脂肪部分)(炭爐燒烤)* Roasted duck (skin and fat) (charcoal grilled)*	3.8	7.1
肉乾(氣體爐燒烤) Dried meat (gas grilled)	1.3	2.3
肉乾(電爐燒烤) Dried meat (electric grilled)	0.3	0.7
海外文獻數據 Overseas data from literatures		
燒烤肉類 Barbecued meat	1.92	157
煙燻魚類 Smoked fish	0.34	50
煙燻肉類 Smoked meat	0.23	40

* 用氣體爐燒烤及電爐烘焗烹製的叉燒、燒肉和燒鴨檢測不出苯並[a]芘。
These three kinds of siu mei prepared by gas grilling and electric oven roasting were not detected with BaP.

焦點個案
Incident in Focus

苯並[a]芘對健康的影響

苯並[a]芘對人類基因有害，並會致癌。雖然這種物質難以釐定安全攝入量，但專家委員會曾於二零零五年發表意見，認為以人類攝入苯並[a]芘的估計分量，對健康影響問題不大。然而，歐洲食物安全局於二零零八年進行評估後，認為綜觀人類攝入PAHs的整體情況，攝入量高的人士有潛在的健康風險。

苯並[a]芘的規管標準

歐盟及中國內地已就各種加工食品中的苯並[a]芘含量制定法定限值(由每公斤1至10微克不等)，其中加工肉類/魚類的最高限值同為每公斤5微克。本港並沒有就食物中的苯並[a]芘含量制定法定限值。當局在作風險評估時，會按每宗個案的苯並[a]芘含量評估對健康造成的影響。上表中數據顯示，部分加工肉類/魚類的苯並[a]芘含量會超過每公斤5微克的最高限值。為減少食物受PAHs污染，食品法典委員會發出了煙燻和直接製乾食物的實務守則，而中心亦推出了《給食物製造商的指引 — 燒烤肉》。



用炭爐燒烤肉類或會產生大量苯並[a]芘
Charcoal grilling of meat may generate a high BaP level

即食麵的調查結果

今年六月，韓國有關當局在一批煙燻魚肉檢出苯並[a]芘含量超出韓國每公斤10微克的法定限值，而農心食品公司曾購買該批魚肉作為即食麵的湯料。雖然檢出的苯並[a]芘含量對人體健康的影響不大，農心食品公司仍自願回收六種即食麵產品的指定批次。

十月三十日，中心公布早前從市面抽取該品牌不同批次即食麵的檢測結果，全部八個樣本(包括五款在本港有售的問題產品)均檢測不到苯並[a]芘。而該品牌的本港代理商亦表示至今未發現有進口有問題批次的食品，但為釋公眾疑慮，該代理商仍決定將該五款產品已進口香港的所有批次自願下架。中心會繼續與韓國當局保持聯絡，密切留意事態發展。

注意要點

- 本港抽驗的“農心”即食麵樣本全部檢測不到苯並[a]芘。
- 苯並[a]芘在環境中無處不在，幾乎所有食物都含有微量苯並[a]芘。
- 烘焗、燒烤、煙燻肉類會產生苯並[a]芘。

給業界的建議

- 採購原材料時要謹慎，以確保食材含有的污染物不會引起食物安全問題。
- 燒烤肉類時避免肉類直接接觸火焰，以及油脂滴在熱源上。
- 用較低溫度烹製肉類及避免過度烹煮。

給公眾的建議

- 切勿過量進食燒烤肉類，尤其是炭爐烤製的肉類及煙燻肉類/魚類。
- 切除燒焦部分。
- 保持均衡及多元化飲食，進食多種蔬果。

Health Effects of BaP

BaP is toxic to genes and can cause cancer in human. A safe intake level cannot be defined for this type of substance. However, JECFA commented in 2005 that the estimated dietary exposure to BaP might be of low human health concern. Whereas, the European Food Safety Authority in the 2008 evaluation commented that the exposure to PAHs as a whole might indicate a potential health concern for high consumers.

Regulatory Standards of BaP

The European Union and Mainland China have set legal limits for BaP in various processed foods (ranged from 1 to 10 µg/kg), of which the same maximum limit of 5 µg/kg is set for processed meat/fish by both authorities. In Hong Kong, no legal limits of BaP are set in food. Risk assessment will be conducted on a case by case basis to assess the health risk of BaP in food. It is observed that the reported BaP levels in some processed meat/fish may exceed the 5 µg/kg level (see Table). To reduce PAH contamination in food, the Codex

Alimentarius Commission has issued a [Code of Practice](#) on processing food by smoking and direct drying, and the CFS has also issued a [guide to food manufacturers on preparing barbecued meats](#).

The Findings on Instant Noodles

In June 2012, the Korean authorities detected BaP in a batch of smoked fish at a level exceeding the Korean legal limit of 10 µg/kg. Nong Shim Company Ltd. had used that particular batch of smoked fish as an ingredient in the instant noodle soup mix. Although the amount of BaP detected has low health concern, the company has voluntarily recalled the concerned batches of the six instant noodle products.

On 30 October 2012, the CFS released the [testing results](#) of the instant noodles, in that all the eight samples (including the five concerned products found locally), from different batches had no BaP detected. Furthermore, the local agent informed that imported products of the concerned batches had not been found. To allay public concern, the local agent has voluntarily removed all batches of the five products concerned from shelves. The CFS will continue liaising with the Korean authorities and closely monitoring the development of the incident.

Key Points to Note

- Samples of the concern brand of instant noodles taken in Hong Kong was not detected with BaP.
- BaP is ubiquitous in the environment and may be present in almost all food at low level.
- Roasting, grilling, barbecuing and smoking of meat may generate BaP.

Advice to Trade

- Exercise due care when sourcing raw materials containing contaminants to ensure that they do not raise food safety concerns.
- Avoid direct contact of meat with flame and fat dripping onto the heat source when barbecuing meat.
- Cook meat at a lower temperature and avoid overcooking.

Advice to Public

- Do not overindulge in barbecued meat, particularly charcoal grilled meat and smoked meat/fish.
- Remove charred parts of food.
- Maintain a balanced and varied diet, which includes a wide variety of fruits and vegetables.

減少從小食脆片攝入鈉 營養標籤幫到你

Cut down Sodium Intake from Crispy Chips

食物安全中心
風險傳達組
科學主任陳家茵女士報告

Reported by Ms. Michelle CHAN, Scientific Officer,
Risk Communication Section,
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食物安全平台
Food Safety
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上一期我們介紹了簡單易用的“活用營養標籤三部曲”(三部曲)，並示範了如何利用三部曲減少從即食麵攝入脂肪。這期我們繼續談談如何利用三部曲減少從小食脆片攝入鈉。

認識鈉

鈉有助維持體液平衡，亦是神經傳送和肌肉收縮方面的必需元素。說起“鈉”，很多人馬上會想到食鹽。其實，食鹽只是我們從膳食中攝取鈉的眾多來源之一。食物和食水中天然存在的鈉，還有預先包裝食物中的含鈉食物添加劑及調味料，例如谷氨酸鈉(俗稱“味精”)和豉油等亦是我們從膳食中攝入鈉的來源。

長期攝取過量鈉會增加患上高血壓的風險，而高血壓是冠心病和中風的風險因素之一。世界衛生組織和聯合國糧食及農業組織建議每日攝入少於2000毫克鈉(約相等於5克或一平茶匙食鹽)。在英國，每100克含有超過600毫克鈉的食物被界定為高鈉食物。

小食脆片與鈉

薯片、蝦條和粟米脆片等都是市面上常見的小食脆片。這些小食在生產時，原料或其混合物會首先切片或壓成不同的形狀，然後拿去炸或烘，放涼後再加上鹽和含鈉的調味粉，調製成各種口味。

此外，小食脆片中一些常用的食物添加劑如增味劑(如味精)和膨脹劑(如碳酸鈉)等都含有鈉。

活用三部曲 減少從小食脆片攝入鈉

首先，“睇營養標籤”，留意標籤上所標示的鈉含量。食物安全中心(中心)在二零一二年研究本港食物的鈉含量時，分析了24款小食脆片樣本的營養標籤，數據顯示小食脆片的鈉含量差別很大，由每100克172毫克至1800毫克不等。所以，消費者應查看營養標籤，選擇鈉含量較低的小食脆片。

其次，“知我食多少”。計算營養素攝入量時，先找出營養標籤上的食物參考量，小食脆片的營養標籤一般以“每100克”標示。鈉攝入量隨着進食的分量多少而有所不同。查看標籤上的食物淨重量，估計一下自己吃了多少，把這個數字與100克比較。

舉例來說，薯片A的淨重量是60克。如果你把薯片A一次吃完，你的進食分量相當於60克/100克，即100克食物的3/5。因此，你的鈉攝入量亦會相等於營養標籤所標示的3/5。根據下面的營養標籤，每100克薯片A含有650毫克鈉，60克薯片A則含650毫克 $\times 3/5 = 390$ 毫克鈉。

In the last issue, we introduced a user-friendly tool, “three-steps to use nutrition labels” (three-steps), and demonstrated how it helps get less fat from instant noodles. In this issue, we will show you how to cut down sodium intake from crispy chips with the three-steps.

Take a Look at Sodium

Sodium is essential to maintain body fluid balance, for nerve transmission and muscle contraction. Talking about sodium, many people will immediately think of table salt. In fact, table salt is only one of the many dietary sources of sodium. People may also ingest sodium naturally present in foods and drinking water as well as those from sodium-containing food additives and condiments like monosodium glutamate (MSG) and soy sauce in prepackaged foods.

Prolonged excessive intake of sodium increases the risk of developing high blood pressure which is a risk factor for coronary heart diseases and stroke. The World Health Organization and the Food and Agriculture Organization of the United Nations recommend limiting daily sodium intake to 2000 mg (approximately equivalent to 5 g or one level teaspoon of table salt). In the United Kingdom, foods with high sodium refer to those with over 600 mg of sodium per 100 g of food.

Crispy Chips and Sodium

Potato chips, prawn crackers, tortilla chips are some of the crispy chips available in the market. In manufacturing these products, the raw materials or their mixes are first sliced or extruded into the desired shapes which are then deep fried or baked. After cooling, salt and flavoured powder containing sodium are added to give a variety of tastes.

Sodium also presents in some commonly used food additives such as flavour enhancer (e.g. MSG) and raising agent (e.g. sodium carbonate).

Cut down Sodium Intake from Crispy Chips with Three-steps

Firstly, **read the nutrition label**. Check the sodium level. Among the food samples collected in the Centre for Food Safety (CFS) [Study on Sodium Content in Local Foods](#) in 2012, nutrition labels of 24 crispy chips samples were examined. The data revealed greatly varied sodium contents of food, ranging from 172 to 1800 mg per 100 g. Consumers should read nutrition labels to identify the lower sodium options.

Secondly, **know how much I eat**. Make reference of the consumption amount to the **reference amount** on the nutrition labels for calculating nutrient intake. Nutrition label of crispy chips is usually expressed as “per 100 g”. Your sodium intake varies proportionately with your consumption amount of food. To estimate your consumption amount, check out the net weight of food and compare your consumption amount to 100 g.

For instance, the net weight of a pack of potato chips A is 60 g. If you consume the whole pack in one go, your consumption amount will account for $60\text{ g}/100\text{ g} = 3/5$ of the 100 g of food. Thus, you will get $3/5$ of sodium as shown on the nutrition label. Referring to the nutrition label below, 100 g of potato chips A contain 650 mg of sodium, 60 g of the food provides $650\text{ mg} \times 3/5 = 390$ mg of sodium.

營養資料 Nutrition Information	
每 100 克 Per 100 g	
能量 Energy	564 千卡 kcal
蛋白質 Protein	5.9 克 g
總脂肪 Total Fat	36 克 g
-飽和脂肪 Saturated fat	14.6 克 g
-反式脂肪 Trans fat	0 克 g
碳水化合物 Carbohydrates	54.1 克 g
-糖 Sugars	1.2 克 g
鈉 Sodium	650 毫克 mg

每100克薯片A含650毫克鈉，在英國被界定為高鈉食物。

100 g of potato chips A contains 650 mg of sodium which meets the high sodium definition in the United Kingdom.

薯片A的營養標籤
Nutrition label of Potato Chips A

其三，“**揀啱我需要**”。將你的營養素攝入量與自己的每天攝取上限比較。吃掉一整包薯片A所攝入的鈉已佔一天攝取上限約20%。想減少攝入鈉，你可以：

- 減少吃薯片A的次數和分量；
- 當天減少進食高鈉食物(例如醃製及罐頭食物)及／或減少使用鹽或含鈉調味料；
- 比較營養標籤，選購鈉含量較低的小食脆片。

更多健康貼士

食物製造商可參考中心的《[降低食物中鈉含量的業界指引](#)》，研發鈉含量較低的食物。除鈉含量外，消費者亦應留意小食脆片的總脂肪和飽和脂肪含量，尤其是經過油炸的小食脆片。

下一期我們會詳述如何利用三部曲，減少從早餐穀類食品攝入糖。

Thirdly, **make better choices**. Compare your nutrient intake to your daily intake upper limit. Consumption of the whole pack of potato chips A accounts for about 20% of your daily limit. To reduce sodium intake, you can:

- consume potato chips A less frequently and in less amount;
- decrease consumption of high sodium food such as preserved and canned food in that day and/or by using less salt or sodium-containing seasonings;
- compare nutrition labels to choose crispy chips with less sodium.

More Healthy Tips

Food manufacturers can make reference to the CFS [Trade Guidelines for Reducing Sodium in Foods](#) to formulate food with lower sodium content. Consumers should also pay attention to total fat and saturated fat contents of the crispy chips especially those deep-fried ones.

In the next issue, we will show you how to reduce sugars intake from breakfast cereals with the three-steps.

食物事故點滴 Food Incident Highlight

關於能量飲品的疑慮

傳媒上月報道，美國一名少女去年在喝了約1.5公升某品牌的能量飲品後死亡。食物安全中心隨即抽驗該品牌在本港售賣的能量飲品，發現其咖啡因含量與咖啡類飲品相若。

能量飲品不含酒精，一般添加了咖啡因、牛磺酸、葡萄糖醛酸內酯以及多種維他命B，聲稱能透過刺激神經系統而起提神作用。

能量飲品含咖啡因及牛磺酸等成分，不宜過量飲用，亦不宜與含酒精飲料或藥物混合飲用。業界應確保其能量飲品適宜供人飲用及符合本港法例，包裝上應標明建議的攝入量，以及不適宜飲用的人群，例如兒童和孕婦等。對咖啡因敏感的人不宜飲用能量飲品，選擇飲品前尤應細閱標籤上的配料表。

Concerns on Energy Drink

Last month, following media reports that a teenage girl in the United States died last year after drinking some 1.5 litres of an energy drink, the Centre for Food Safety sampled energy drink products of the same brand from the local market and found the caffeine contents were comparable to coffee beverages.

Energy drinks are non-alcoholic beverages that contain ingredients such as caffeine, taurine, glucuronolactone and B vitamins. They are marketed to achieve an energy enhancing effect by stimulating the nervous system.

Energy drinks should not be consumed excessively as they contain caffeine and taurine etc., and should not be mixed with alcohol or drugs. The trade should ensure that energy drinks are fit for human consumption and comply with local legislation. Information should be provided on the packaging with the suggested intake, stating clearly the unsuitable groups of consumers such as children and pregnant women. Individuals sensitive to caffeine should refrain from energy drinks and take note of the ingredient list on beverage labels.

基因改造粟米致癌？

近期有海外研究指出，實驗老鼠被餵食基因改造粟米NK603後多種器官受到損害並長出腫瘤。

NK603是一種能抵受某種特定除草劑的基因改造粟米，在加拿大、澳洲、日本、美國、歐盟及中國內地等多個國家均通過了安全評估，自二零零零年起獲准作食物用途。歐洲食物安全局最近對上文提及的研究報告展開審查，認為該份有關基因改造粟米NK603毒性的研究報告的科學證據不充分，不足以成為風險評估的理據。

業界應確保其出售的基因改造食物已通過適當的安全評估，適宜供人食用；並應按照《[基因改造食物自願標籤指引](#)》的規定，在基因改造食物上加上標籤。

Genetically Modified Corn Tied to Cancer?

Recently, an overseas study reported that rats fed on a genetically modified (GM) corn NK603 suffered tumours and multiple organ damage.

NK603 is a GM corn engineered to confer tolerance to a particular herbicide. It has undergone safety assessment in a number of countries such as Canada, Australia, Japan, the United States, the European Union and mainland China, and has been approved for food use since 2000. Recent evaluation conducted by the European Food Safety Authority has concluded that the concerned study on toxicity of NK603 is of insufficient scientific quality to be considered as valid for risk assessment.

Traders should ensure their GM food products have undergone proper safety assessment and are fit for human consumption. GM food should also be labelled as such in accordance with the "[Guideline on Voluntary Labelling of Genetically Modified \(GM\) Food](#)".

風險傳達 工作一覽 Summary of Risk Communication Work

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