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## 焦點個案

### Incident in Focus

## Learn More about Luncheon Meat and Sausages

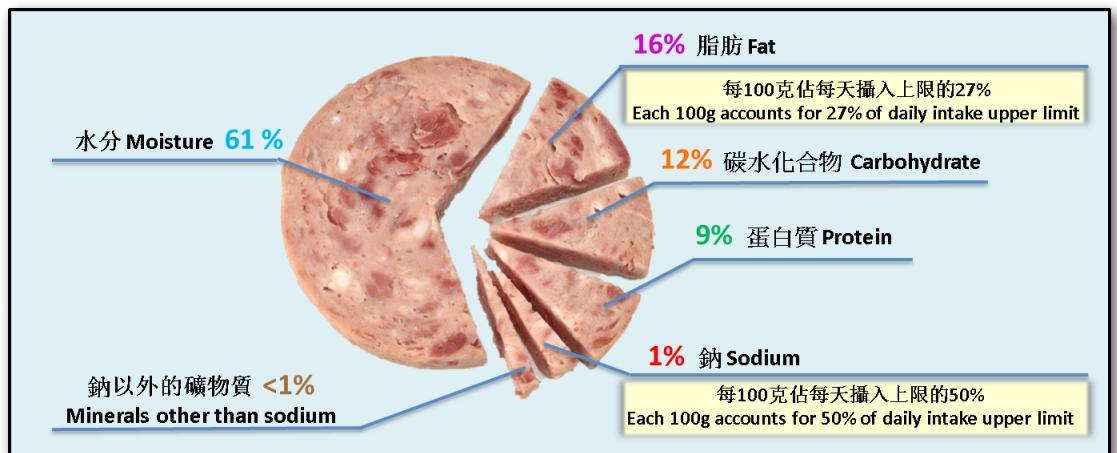
## 餐肉腸仔知多些

食物安全中心  
風險評估組  
吳雪兒獸醫報告

Reported by Dr. Cherrie NG, Veterinary Officer,  
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二零一七年六月中，一個本地研究公布有關午餐肉及罐裝香腸的調查結果，發現大部分樣本的鈉及脂肪含量很高，並在其中一個午餐肉樣本發現抗菌素殘餘。本文將探討有關午餐肉及部分香腸的製作、當中的鈉和脂肪含量、午餐肉樣本檢出的抗菌素殘餘，並向市民及業界提供建議。

In mid June 2017, the results of a local study on luncheon meat and canned sausages were released. It was found that the majority of the samples were high in sodium and fat content. In one luncheon meat sample, residue of antimicrobials was found. This article discusses the production of luncheon meat and some sausages, their sodium and fat content, the antimicrobial residue detected in the luncheon meat sample and gives advice to the public and the trade.



圖一：午餐肉的營養成分(資料來源:營養資料查詢系統, 營養成分或會因產品配方而有差異)。  
Figure 1: Nutritional composition of luncheon meat (source: Nutrient Information Inquiry System, nutritional composition may vary depending on the formula of the products).

## 午餐肉及部分香腸的製作過程

午餐肉及部分香腸是由肉類、水及醃料(包括鹽及亞硝酸鹽)等必要配料製成的合成食品，當中亦可加入脂肪(動物脂肪或植物油)、香料、其他配料及添加劑。這些配料是在未煮熟情況下加工，製成肉漿後加熱，成為最終製成品。除了提供鹹味外，鹽有助打開蛋白質的結構以便結合水分並形成肉漿。亞硝酸鈉/亞硝酸鉀是一種可使加工肉類製品產生其特有粉紅色的醃料，並能在加熱時與蛋白質產生反應結合可抑制肉毒桿菌孢子形成的化合物。

## 加工肉類與健康

### 第1組：令人類患癌

根據國際癌症研究機構(IARC)的分類，加工肉類(包括午餐肉及香腸)屬會令

## Production of Luncheon Meat and Some Sausages

Luncheon meat and some sausages are compound food with essential ingredients of meat, water and curing ingredients consisting of salt and nitrites. Fat (in the form of animal fat or vegetable oil), spices, other ingredients and additives may also be added. The components are processed raw and the resulting viscous batter is then heated to make the end product. Apart from providing the salty flavour, salt also helps opening up the structure of proteins in combination with water to assist in forming the batter. Sodium / potassium nitrite is a curing ingredient which is added to produce the development of the characteristic pink colour in processed meat products, and reacts with proteins to form compounds that inhibit the development of spores of *Clostridium botulinum* when heated.

## Processed Meat and Health

### Group 1 Carcinogenic to Humans

According to the International Agency for Research on Cancer (IARC), processed meat (including luncheon meat

焦點個案  
Incident in Focus

人類患癌(第1組)，每天食用50克加工肉類可增加患大腸癌的風險18%。世界衛生組織(世衛)建議進食肉類的人士應節制進食加工肉類，以減低患上大腸癌的風險。

高鈉及高脂

由於加入了食鹽(氯化鈉)及亞硝酸鈉(若被選用作醃料)，午餐肉的鈉含量通常很高。在午餐肉加入脂肪更可令肉質更柔軟，味道更可口。攝取過多鈉會增加患上高血壓的風險，而攝取過量脂肪則會增加超重及肥胖症的風險，患上心臟病及其他非傳染的慢性疾病的風險亦因而提高。每100克午餐肉(約半罐小罐裝午餐肉)平均含有大約1000毫克鈉及16克脂肪，分別佔世衛所建議的鈉的每天攝取上限2000毫克的50%，以及脂肪的每天攝取上限60克的27%(以2000千卡膳食計算)(圖一)。消費者可查看預先包裝食品上的營養標籤，從而作出知情的選擇。

抗菌素殘餘

世界動物衛生組織指出，抗菌素對保障人類與動物健康以及維護動物福利至關重要，因此世界動物衛生組織主張負責任和慎重地使用抗菌素。食品法典委員會於“食品中獸藥殘留的最大殘留限量和風險管理建議”中訂明獸藥殘餘標準。該本地研究針對合成食品(例如午餐肉)中的最高殘餘限量，食品法典委員會最高殘餘限量則適用於原來的動物組織。香港亦採用與食品法典委員會類似做法，即食物所含獸藥殘餘的最高濃度適用於肌肉、肝臟及腎臟等，而不適用於合成食品。一般來說，其他國家的主管當局在對獸藥殘餘的規管上，會將最高殘餘限量應用於原料(即動物組織)。

至於產生抗菌素耐藥性的可能性，單次攝入食物中的獸藥殘餘不大可能導致腸道菌群產生抗菌素耐藥性。此外，現時並無充分證據確定長期從食物攝入低劑量抗菌素殘餘會顯著增加抗菌素耐藥性微生物在腸道菌群滋長。有關風險尚待進一步研究評估。

注意要點：

1. 午餐肉及香腸等加工肉類已被IARC分類為人類致癌物。
2. 加工肉類的鈉含量通常很高。
3. 世衛建議，進食肉類的人士應節制進食加工肉類，以減低患上大腸癌的風險。

給業界的建議

- 嚴格遵守本地規例，包括《食物及藥物(成分組合及標籤)規例》、《食物內防腐劑規例》及《食物內有害物質規例》有關營養標籤、添加劑的使用及獸藥殘餘的規定。

給市民的建議

- 節制進食加工肉類，以減低患上大腸癌的風險。
- 閱讀營養標籤，從而作出知情的食物選擇和減低鈉的攝入量。

and sausages) is carcinogenic to humans (Group 1) and each 50g portion of processed meat consumed daily can increase the risk of colorectal cancer by 18%. The World Health Organization (WHO) advises that people who eat meat should moderate the consumption of processed meat to reduce the risk of colorectal cancer.

High in Sodium and Fat

The sodium content of luncheon meat is usually high because common salt (sodium chloride), and sodium nitrite (if chosen to be the curing ingredient) are added. Fat is also added to make the product softer and more palatable. Eating too much sodium increases the risk of high blood pressure and excessive intake of fat increases the risk of overweight and obesity; these in turn are risk factors of heart diseases and other chronic non-communicable diseases. On average, 100g (around half a small can) of luncheon meat contains approximately 1000mg of sodium and 16g of fat, which contributes to 50 % of the daily intake upper limit of 2000mg of sodium and 27% of the daily intake upper limit of 60g of fat (based on a 2000-Kcal diet) respectively as recommended by WHO (Figure 1). To make an informed choice, consumers can read the nutrition labels on prepackaged food.

Antimicrobial Residue

According to the World Organisation for Animal Health (OIE), antimicrobial agents are essential to protect human and animal health, as well as animal welfare. Therefore the OIE advocates the responsible and prudent use of antimicrobial agents. The Codex Standards in relation to veterinary drug residues are specified in the “Codex Alimentarius Maximum Residue Limits (MRLs) and Risk Management Recommendations for Residues of Veterinary Drugs in Foods”. Whilst the fore-mentioned local study put focus on the MRL in compound food such as luncheon meat, Codex MRLs are applicable to the original animal tissues instead. In Hong Kong, similar approach is adopted where maximum concentrations are applicable to commodities such as muscle, liver and kidney, but not compound food. In general, competent authorities in other countries regulate the potential contamination of veterinary drug residue by applying MRLs in the raw materials, i.e. animal tissues.

With regards to the possibility of development of antimicrobial resistance (AMR), a single exposure to residues of veterinary drugs is unlikely to cause AMR in the intestinal flora. In addition, there is currently no sufficient evidence to affirm that chronic exposure to low dose of antimicrobial residues in food can significantly increase the development of resistance microorganisms in the intestinal flora. Further studies on the associated risk are required.

Key Points to Note:

1. Luncheon meat and sausages are processed meat which is classified as carcinogenic to humans by the IARC.
2. Processed meat generally has high sodium content.
3. The WHO advises that people who eat meat should moderate the consumption of processed meat to reduce the risk of colorectal cancer.

Advice to the Trade

- Adhere strictly to the local regulations, including the Food and Drugs (Composition and Labelling) Regulations, Preservatives in Food Regulation and Harmful Substances in Food Regulations with regards to nutrition labelling, use of food additives and veterinary drug residue respectively.

Advice to the Public

- Moderate the consumption of processed meat to reduce the risk of colorectal cancer.
- Read the nutrition labels to make informed choices of food and reduce sodium intake.

# 引起重大公共衛生關注的金屬污染物 Metallic Contaminants of Major Public Health Concern

食物安全中心  
風險評估組  
科學主任馬嘉明女士報告

Reported by Ms. Janny MA, Scientific Officer,  
Risk Assessment Section,  
Centre for Food Safety

金屬在環境中無處不在，並可能污染食物。在食物中可能存在的金屬污染物中，**砷、鎘、鉛及汞**是世界衛生組織識別為引起重大公共衛生關注的四種金屬。本文將探討減少市民從本地總膳食研究所載的主要食物來源中攝入該等金屬污染物的方法。

## 米中的砷

砷是一種準金屬，以無機及有機形態存在。國際癌症研究機構總結認為砷及無機砷化合物會令人類患癌(第1組)。

由於通過泥土及水的吸收，砷可能存在于不同的食物。與其他穀物相比，米尤其吸收較多的砷，而無機砷是米中砷的重要毒性形態。由於碾磨過程能把含有大部分無機砷的穀皮去掉，故精米(白米)的無機砷含量較糙米為低。不過，進食糙米亦有益處，例如高含量的膳食纖維。

作為主要食糧，米是本地市民從膳食中攝入無機砷的主要來源，單是白米飯已佔總攝入量約45%。有研究顯示，以大量水煮飯(一份米對六至十份水)，然後棄掉過量的水，可減低米飯的無機砷含量。此外，另有研究顯示，在烹煮前洗米，即使可能失去一些營養素，例如鐵、煙酸、硫胺素及葉酸，亦可減低白飯的無機砷含量。要減少從膳食中攝入無機砷，消費者亦可考慮選擇多食用其他穀類及穀類製品，例如麵條、麥皮/燕麥片及麵包，其無機砷含量一般較米為低(圖二)。

## 魚類中的汞

汞以多種形態存在，即金屬汞、無機汞和有機汞。甲基汞是有機形態的汞，毒性較無機汞強。以胎兒、嬰兒及兒童來說，甲基汞對健康的主要影響是導致神經發育受損。孕婦從膳食中攝入甲基汞，腹中胎兒便會攝入甲基汞，對胎兒發育中的腦部及神經系統造成不良影響。

魚類是甲基汞的主要膳食來源。**捕獵魚類**比**非捕獵魚類**更可能累積較高含量的甲基汞。因此，計劃懷孕的婦女、孕婦及幼童應避免進食某些**甲基汞含量可能較高的**魚類，例如鯊魚、劍魚、旗魚、金目鯛及吞拿魚。

然而，魚類含有人體成長和發育所需的多種營養素，例如奧米加-3脂肪酸及優質蛋白質，因此進食多種魚類和保持均衡飲食十分重要。婦女和幼童的膳食尤應加入魚類。

## 蔬菜中的鉛

食物中的鉛污染源自各種來源，包括空氣及泥土。長

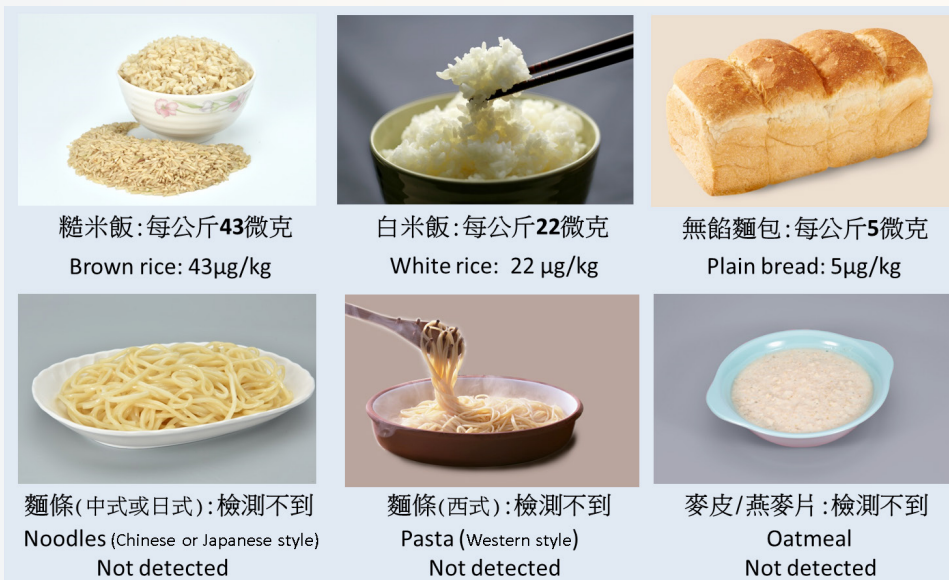
Metals are ubiquitous in the environment and may contaminate our food. Among the metallic contaminants which may be found in our food, four of them, namely **arsenic, cadmium, lead and mercury** are identified as of major public health concern by the World Health Organization. In this article, we are going to explore ways to reduce their exposures from the respective major food contributors of the population as revealed from the local Total Diet Study.

## Arsenic in Rice

Arsenic is a metalloid that occurs in inorganic and organic forms. The International Agency for Research on Cancer (IARC) has concluded that arsenic and inorganic arsenic compounds are carcinogenic to humans (Group 1).

Arsenic may be present, due to absorption through soil and water, in various foods. Rice in particular can take up more arsenic than other grains while inorganic arsenic is considered the significant toxic form of arsenic in rice. Polished (white) rice contains less inorganic arsenic than husked (brown) rice as polishing can remove bran layer which contains most of the inorganic arsenic. However, there are also benefits associated with the consumption of brown rice e.g. high content of dietary fibre.

As a staple food, rice is a major contributor of the dietary exposure to inorganic arsenic, in which cooked white rice alone accounted for about 45% of total exposure in the local population. Studies have indicated that cooking rice with large amounts of water (from six to 10 parts of water to one part of rice) followed by discarding excess water can reduce inorganic arsenic in rice. There are also studies showing that washing rice before cooking, even though it may also wash off some nutrients like iron, niacin, thiamine and folate, can also reduce inorganic arsenic in white rice. To reduce inorganic arsenic exposure from diet, consumers may also consider choosing more other cereals and their products e.g. noodles, oatmeal and bread, which generally contain lower levels of inorganic arsenic than rice (Figure 2).



圖二：香港總膳食研究顯示各種穀類及穀類製品的無機砷平均含量。  
Figure 2. Average level of inorganic arsenic in various cereals and their products as revealed in the local Total Diet Study.

oatmeal and bread, which generally contain lower levels of inorganic arsenic than rice (Figure 2).

## Mercury in Fish

Mercury exists in several forms i.e. metallic, inorganic and organic. Methylmercury, an organic form of mercury, is more toxic than inorganic mercury. The primary health effect of methylmercury is impaired neurological development in foetuses, infants, and children. Methylmercury exposure in the womb, which can result from a mother's diet, can adversely affect a baby's growing brain and nervous system.

Fish is the major dietary source of methylmercury. **Predatory fish** are more likely to accumulate higher amount of methylmercury than non-predatory fish species. Women planning pregnancy, pregnant women and young children should therefore avoid eating certain types of **fish which may contain high levels of methylmercury** such as shark, swordfish, marlin, alfonso and tuna.

However, consuming a variety of fish and maintaining a balanced diet are important as fish contains many essential nutrients for growth and development such as omega-3 fatty acids and high quality proteins. Women and young children in particular should include fish in their diets.

## Lead in Vegetables

Lead contamination of food arises from various sources, including air and soil. Chronic exposure of lead may lead to reduction of intelligence quotient (IQ) in

期攝入鉛，可引致兒童智力受損和成人血壓上升。

“蔬菜及蔬菜製品”是本地市民攝入鉛的主要膳食來源(佔總攝入量的30%)。葉菜類蔬菜較非葉菜類蔬菜或根菜類蔬菜更易積聚空氣中(例如來自工業污染)的鉛。

進食足夠分量的蔬菜(每日最少三份蔬菜，每份約80克)是健康飲食的重要一環。在烹煮前先用水徹底清洗蔬菜(特別是葉菜類蔬菜)，可清除蔬菜表面積聚的大部分受鉛污染的塵埃及泥土。此外，保持均衡飲食，進食多種蔬菜(不限於葉菜類蔬菜)，可避免因偏食幾類食品而攝入過量鉛。

### 下期內容...

我們將會繼續探討餘下引起重大公共衛生關注的金屬污染物 - 鎘。

children and increase in blood pressure in adults respectively.

“Vegetables and their products” is the main dietary source of lead (30% of the total exposure) in the local population. Leafy vegetables are more vulnerable than non-leafy vegetables or root vegetables to deposition from airborne lead e.g. from industrial pollution.

Adequate amount of vegetable intake (daily intake of at least 3 servings; about 80g per serving) is an essential component of healthy eating. Wash vegetables, particularly leafy vegetables, thoroughly in water before cooking can remove a significant portion of lead-contaminated dust and soil that are deposited on the surfaces of the vegetables. In addition, maintaining a balanced diet with a variety of vegetables, not limited to leafy vegetables, can also avoid excessive exposure to lead from a small range of food items.

### In the next issue...

We will continue with the remaining metallic contaminant - cadmium, which is also of major public health concern.



## 防微杜漸食物安全謠傳

近年，林林總總的食物安全事故傳聞/虛假訊息經社交媒體散播已成為全球現象。聲稱涉事的食物不勝枚舉，包括“魚類/水果的SK5病毒”、“假米”及“遭受滋病病毒/愛滋病血液污染的水果罐頭”。若未能在萌芽階段適時粉碎這些傳聞，可能會引起不必要的恐慌，影響食物供應/選擇。一些傳聞之前雖經各食物安全監管機構反駁，但在數月或數年後可能會再度傳出，只是換了涉事食物類別、造成的危害及聲稱的衛生問題。

食物安全中心(中心)一直致力闢謠，盡力減低市民不必要的恐懼及憂慮，並通過不同渠道，例如中心網站的**食物安全專頁**及**食物安全焦點**，以及**中心的面書(Facebook)**發布科學知識及真確資料。不過，由於社交媒體流傳失實資訊的速度迅速、傳播範圍又廣，故中心所面對的挑戰甚大。市民在制止傳聞散播上擔當重要的角色。市民與親朋戚友分享傳聞前，應先瀏覽食物安全監管機構的官方網站，核實訊息是否正確。

## Nip Food Safety Rumours in the Bud

In recent years, spreading of rumours/hoaxes about various foods safety issues via social media has become a global phenomenon. The alleged foods include “SK5 virus in fish/fruits”, “Fake rice”, and “HIV/AIDS blood-tainted canned fruits”, to name but a few. These rumours, if not nipped in the bud timely, may result in unnecessary panic, alarm and impact on food supply/choice. Rumours previously dismissed by various food safety authorities may revive after a few months or years, with a twist of the food types, hazards, and claimed health issues.

The Centre for Food Safety (CFS) is devoted to debunk rumours and minimise the unnecessary fear and anxiety in the public. Science-based knowledge and accurate information are disseminated through channels, such as **Food Safety Topics** and **Food Safety Focus** in CFS website, and **CFS Facebook**. However, the speed and coverage of the spread of invalidated information circulated in the social media pose much challenge to us. The public can play an important role in stopping the rumours spread. Verify the accuracy by browsing the food safety authorities official websites before sharing rumours with families and friends.

## 即食麵中的抗氧化劑-特丁基對苯二酚

最近，有傳媒探討有關即食麵的害處，其中一項指控是即食麵含有所謂的“致癌物質”特丁基對苯二酚(TBHQ)。

特丁基對苯二酚(國際編碼系統編號319)為食物添加劑，一般用於以動物製成的食品、脂肪或油類作為抗氧化劑。特丁基對苯二酚能抑制脂肪及油類的酸敗，延長保質期。國際食物安全監管機構已評估特丁基對苯二酚的安全性，結論認為特丁基對苯二酚不會令人致癌，食物加入容許的含量可供安全食用。食品法典委員會及香港均容許在即食麵中使用特丁基對苯二酚，含量最高可達百萬分之二百(以脂肪計算)。

即食麵中的特丁基對苯二酚並非食物安全問題。然而，即食麵一般屬高鹽高脂。若要保持均衡飲食，消費者可嘗試選擇其他低鹽低脂的替代食物，例如淨麵、米粉、通心粉等，並加上一些新鮮蔬菜、瘦肉及少許調味料。

## The Antioxidant, TBHQ, in Instant Noodles

Recently, media discussed the harmful effects of instant noodles. One of the accusations is that they contain a so-called “cancer-causing agent”, TBHQ (tertiary butylhydroquinone).

TBHQ (INS no. 319) is a food additive, generally used as an antioxidant in animal-derived food products and in fats or oils. It can retard rancidity in fats and oils and extend their shelf life. The safety of TBHQ has been evaluated by international food safety authorities. It is concluded that TBHQ is not carcinogenic and is safe to consume at the level allowed in foods. Both Codex and Hong Kong allow the use of TBHQ in instant noodles up to 200 ppm (fat basis).

TBHQ in instant noodles should not be a food safety concern. However, instant noodles are generally high in salt and fat. For maintaining a balance diet, consumers may choose other low salt and low fat alternatives such as plain noodles, vermicelli, macaroni etc. added with some fresh vegetables, lean meats and a little seasoning.

## 風險傳達 工作一覽 Summary of Risk Communication Work

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