食物安全焦點
Food Safety Focus

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食物環境衞生署 Food and Environmental Hygiene Department

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Melamine-ware and Food Safety

食物安全中心
風險評估組
科學主任鄧紹平博士報告

Reported by Dr. Anna S. P. TANG, Scientific Officer,
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香港海關就市面上的仿瓷餐具進行安全測試後，於今年二月十九日呼籲市民留意一款甲醛超逾遷移上限的仿瓷湯匙。本文將會探討與仿瓷餐具有關的食物安全事宜。

On 19 February 2009, the Customs and Excise Department advised the public to watch out for one model of melamine ladle with excessive level of formaldehyde migration following safety test conducted on melamine tableware obtained from the market. In this article, we will talk about food safety issues in relation to melamine tableware.

仿瓷餐具 **Melamine-ware**

仿瓷餐具是什麼？

由三聚氰胺-甲醛樹脂製成以供多次使用的餐具俗稱為仿瓷餐具。這些餐具經濟耐用，又具有良好的耐熱性及化學穩定性，故在世界各地廣為使用。仿瓷餐具由於不易摔破，因此常用作兒童餐具。

仿瓷餐具可否供安全使用？

仿瓷餐具只要根據製造商的指定用途使用，一般可供安全盛載食物。大部分製造商列明餐具適用於攝氏-30度至120度，而有些則註明最高可達攝氏140度。因此，仿瓷餐具不應放進微波爐或傳統焗爐內作烹煮或加熱食物之用。

三聚氰胺和甲醛是仿瓷餐具製造原料的主要化學成分。這些化學物的殘餘物可殘留在最終製成品中，並遷移至食物。仿瓷餐具偶爾會出現化學物過量遷移的情況。仿瓷餐具在這些情況下的安全問題通常與甲醛可能遷移至食物有關。

化學物質的遷移

物質由餐具遷移至食物受多項因素影響，包括餐具原料；食物類別(水性、酸性、酒精類或脂肪類)及性質(固體或液體)；溫度；盛載時間以及接觸面。

What is Melamine-ware?

Tableware made of melamine-formaldehyde resins intended for repeated use is commonly known as melamine-ware. It is economical and widely used around the world due to its durability, and good chemical stability and heat resistance. Since melamine-ware does not easily break, it is commonly used as tableware for children.

Is Melamine-ware Safe to Use?

Melamine-ware is generally safe to use for serving food so long as it is used for the purposes specified by the manufacturer. Most manufacturers specify a temperature of -30°C to +120°C while some specify a temperature of up to +140°C. Hence, it should not be used for cooking or to be heated in microwave or conventional oven.

Melamine and formaldehyde are the chemical building blocks of the material used in melamine-ware. Residues of these chemicals can be left in the finished product and can migrate into food. Occasionally, excessive migration of chemicals had been found in melamine-ware. Safety concerns of melamine-ware in these cases are usually related to the possible migration of formaldehyde into foodstuffs.

Migration of Chemical Substances

Migration of substances from tableware to foodstuffs is influenced by many factors including the material of the tableware, the type (aqueous, acidic, alcoholic or fatty) and nature (solid or liquid) of the food, temperature, duration and area of contact.

There is currently no specific international limit regarding the migration of chemicals from melamine-ware. Specific migration limits have been established in some countries such as the European Union and Mainland China to regulate melamine-ware for food use.

焦點個案
Incident in Focus

目前，國際間並沒有就仿瓷餐具遷移出的化學物訂出特定上限。部分國家如歐洲聯盟及中國內地則有訂出特定遷移上限，以規管用作盛載食物的仿瓷餐具。

英國食物標準局在二零零四年及二零零八年進行的海外研究(只有英文版)指，只有少數仿瓷餐具在實驗環境中模擬最差情況下遷移出的甲醛會超逾上限，而遷移出的三聚氰胺則遠低於上限。至於最近國家質量監督檢驗檢疫總局在二零零八年十二月進行的抽查檢驗，則顯示由獲得許可證的內地製造商製造的所有受檢驗仿瓷餐具均符合國家標準規定。

食物中的三聚氰胺和甲醛對健康的影響

三聚氰胺的急性毒性偏低。國際癌症研究機構由於沒有有關人類的足夠證據，故把三聚氰胺列為第3組(在會否令人類患癌方面未能分類)。二零零八年，在有關內地嬰兒和兒童因飲用受大量三聚氰胺污染的奶粉而患上腎結石的報道後，世界各地均十分關注這種物質。其後，世界衞生組織(世衞)制定三聚氰胺的每日可容忍攝入量為每公斤體重0.2毫克。

雖然甲醛不得用於食物中，但它是一種代謝中間物，可天然存在於水果及蔬菜、肉類、魚類及甲殼類動物等食物中，含量可達每公斤300至400毫克。吃下小量甲醛不會造成急性中毒，但吃下大量甲醛則可造成急性中毒，引致嚴重腹痛、嘔吐、昏迷、腎臟受損或死亡。不過，由仿瓷餐具遷移至食物的甲醛導致這種攝入情況的機會不大。世衞認為，透過進食而攝入的甲醛不會致癌。

注意重點：

1. 由適當製造的仿瓷餐具遷移至食物的小量三聚氰胺和甲醛，相信不會損害人體健康。
2. 如按照製造商的指示使用，仿瓷餐具可供安全盛載食物。
3. 切勿把仿瓷餐具放進微波爐或傳統焗爐內作烹煮或加熱食物之用，又或用來盛載熱油、油炸食物或強酸食物。

本港對盛載食物的用具的規管

盛載食物的容器屬於一種消費品，一般供應予私人使用或耗用，須受《消費品安全條例》(第456章)規管。《食物業規例》(第132X章)第6條訂明，所有經營食物業的人，須時刻確保所使用或可能使用的一切家具、物品、設備及用具保持清潔，不受有害物質沾染，維修妥善及無裂縫或缺口。

給消費者的建議

1. 按照產品說明使用仿瓷餐具。
2. 切勿使用已破裂或表面受損的仿瓷餐具。
3. 切勿使用仿瓷餐具烹煮或加熱食物。
4. 切勿把仿瓷餐具放進微波爐或傳統焗爐內使用。
5. 切勿以仿瓷餐具盛載熱油、油炸食物或強酸食物。
6. 切勿使用含砂質的清潔劑、可造成刮花的清潔用具或強力化學物清潔仿瓷餐具，因為會損害其表面。

給業界的建議

1. 製造商在製造供盛載食物的仿瓷餐具時，應奉行優良製造規範。
2. 製造商宜就仿瓷餐具的指定用途提供說明。
3. 食肆及食物業應按照產品說明使用合適品質的仿瓷餐具盛載食物。

Overseas surveys conducted by United Kingdom Food Standards Agency (UKFSA) in 2004 and 2008 reported only a few melamine-ware had formaldehyde migration exceeding limits under experimental conditions simulating the worst case scenario, while melamine migration was well below limits. Recent survey conducted by the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) in December 2008 found all melamine-ware tested that were produced by certified manufacturers in the Mainland were satisfactory.

Health Concerns of Melamine and Formaldehyde in Foods

Melamine is known for its low acute toxicity. International Agency for Research on Cancer (IARC) classified it as "not classifiable according to its carcinogenicity to humans" (Group 3) due to inadequate evidence in humans. In 2008, significant concerns were raised worldwide following reports of renal stones in infants and children who had consumed milk tainted with high levels of melamine in the Mainland. Subsequently, the World Health Organization (WHO) established a tolerable daily intake for melamine at 0.2 mg/kg body weight.

Although formaldehyde is not permitted to be used in foods, it is a metabolic intermediate which can be found naturally in food up to levels of 300 – 400 mg/kg, including fruits and vegetables, meat, fish, crustaceans etc. Ingestion of a small amount of formaldehyde is unlikely to cause any acute effect. However, ingestion of a large amount can result in acute toxicity causing severe abdominal pain, vomiting, coma, renal injury and possible death. But such an exposure is unlikely from formaldehyde migration to food from melamine-ware. WHO considered that formaldehyde was not carcinogenic upon ingestion.

Key Points to Note:

1. Migration of a small amount of melamine and formaldehyde from properly made melamine-ware into foods is not expected to cause adverse health effects.
2. Melamine-ware is safe for food use when used according to the manufacturer's instructions.
3. Melamine-ware should not be used for cooking or heating in microwave or conventional oven, holding hot oil, deep-fried foods, or storing highly acidic foods.

Control on food-containing utensils in Hong Kong

Food containers, as a kind of consumer goods, which are ordinarily supplied for private use or consumption in Hong Kong are controlled under the Consumer Goods Safety Ordinance, Cap. 456. Section 6 of Food Business Regulation Cap. 132X stipulated that every person who carries on any food business shall at all times ensure that all furniture, articles, equipment and utensils used or liable to be used are kept clean and free from noxious matters and in proper repair and free from cracks or chipping.

Advice to Consumers

1. Use melamine-ware according to product instructions.
2. Do not use melamine-ware that is broken or damaged on its surface.
3. Do not heat or cook foods in melamine-ware.
4. Do not use melamine-ware in microwave oven or conventional oven.
5. Do not use melamine-ware to hold hot oil, deep-fried foods, or store highly acidic foods.
6. For cleaning, do not use abrasive detergent and cleaning tools or strong chemicals which will damage the surface.

Advice to the Trade

1. Manufacturers should adopt good manufacturing practices in making melamine-ware for food use.
2. Manufacturers are advised to provide instructions on its intended use.
3. Restaurants and food businesses should use melamine-ware of suitable quality to serve food according to the product specifications.

食物安全平台
Food Safety Platform

營養素與健康：膽固醇
Nutrient and Health - Cholesterol

食物安全中心
風險傳達組
科學主任馮慧中女士報告

Reported by Ms. Jacqueline FUNG, Scientific Officer,
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我們在上一期介紹了各類脂肪，今期將會探討另一種常見的脂類：膽固醇。

膳食膽固醇的來源

膳食膽固醇存在於大部分動物源性食物(蛋白除外)。人們常常以為飽和脂肪含量高的食物會有大量膽固醇。事實上，食物中的飽和脂肪含量與膽固醇含量並無關係。舉例來說，蝦便是膽固醇含量高(每100克含180毫克膽固醇)但飽和脂肪含量低(每100克含0.4克飽和脂肪)的食物。

膳食膽固醇與脂蛋白

有些人會弄不清膳食膽固醇與血膽固醇的分別。食物中的膳食膽固醇是複合脂類，不能區分為“好”和“壞”，而我們常指在人體內的血膽固醇則是脂類與蛋白質合成的脂蛋白。脂蛋白把脂類由肝臟輸送到細胞，又或由細胞輸送到肝臟。換言之，脂蛋白負責在人體內輸送甘油三酸酯及膽固醇。

血液中所謂的“壞”膽固醇和“好”膽固醇，分別指低密度脂蛋白膽固醇(LDL-C)和高密度脂蛋白膽固醇(HDL-C)。一般而言，“壞”膽固醇(即低密度脂蛋白膽固醇)水平偏高及/或“好”膽固醇(即高密度脂蛋白膽固醇)水平偏低的人會較容易患上各類心臟疾病。

人體內膽固醇的來源

膳食膽固醇與人體內膽固醇的關係相當複雜。簡單而言，人體內膽固醇只有一小部分是來自膳食膽固醇，大部分是由肝臟自行合成。身體健康的人可透過體內的自行調節功能，幫助控制膽固醇水平。

膽固醇的功能

膽固醇是人體細胞膜的主要成分，亦是合成維他命D、膽汁和部分荷爾蒙(如睪丸素這種性荷爾蒙及皮質素這種腎上腺荷爾蒙)的必需元素。

膽固醇對健康的影響

許多人認為膽固醇是“壞”東西，因為會增加患上心血管系統疾病的風險。事實上，膽固醇對人體極其重要，只有在膽固醇水平超逾某限度時，才會危害健康。

膽固醇在人體內由脂蛋白輸送。當膽固醇在血管中運行時，有一部分會在血管壁內沉積，這樣可能會引致動脈粥樣硬化症(動脈硬化)，因而增加患上心臟病或中風的風險。

蛋類和魷魚含有大量膽固醇
Egg and cuttlefish have high cholesterol content

值得我們注意的是，有證據顯示，以患上心血管系統疾病的風險而言，攝入飽和脂肪及反式脂肪比攝入膳食膽固醇更為重要，特別是有些研究結果指出，增加攝入飽和脂肪或會令人體製造更多膽固醇，因此單憑減少攝入膳食膽固醇未必有助降低血膽固醇水平。為心臟健康着想，除了膳食膽固醇外，我們更應留意飽和脂肪及反式脂肪的攝入量。

膳食膽固醇與飽和脂肪的攝入量

根據中國適宜攝入量，飽和脂肪應佔少於10%的能量攝入量，即2 000千卡的膳食應從各類食物中共攝取少於22克飽和脂肪。至於膳食膽固醇，其參考攝入量與能量需要量(即膳食中的千卡數量)無關，因為膳食膽固醇不會令人體產生能量。我們建議一名成年人每天應進食少於300毫克膳食膽固醇(遠低於飽和脂肪攝入量)。

We examined different types of fat in the last issue. This time, we will explore another common lipid - cholesterol.

Sources of Dietary Cholesterol

Dietary cholesterol is found in most animal foods, with egg white being an exceptional case. Often, people think that foods containing high saturated fat have significant amount of cholesterol. The truth is that there is no link between saturated fat and cholesterol contents in foods. For example, shrimps have high cholesterol (180mg cholesterol per 100g) and low saturated fat (0.4g saturated fat per 100g) contents.

Dietary Cholesterol and Lipoprotein

There is confusion about the difference between dietary cholesterol and blood cholesterol. Dietary cholesterol in food is a lipid compound and cannot be separated into "good" or "bad" ones, whereas the commonly known blood cholesterol in the body is a lipoprotein, which is a complex of lipids and proteins. Lipoprotein carries lipids from liver to cells and vice versa. In other words, lipoprotein is responsible for transporting triglyceride and cholesterol in the body.

The so called "bad" cholesterol and "good' cholesterol in blood are the low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C), respectively. Generally speaking, individuals with higher level of "bad" cholesterol (i.e. LDL-C) and/or lower level of "good" cholesterol (i.e. HDL-C) will have higher risk of heart diseases.

Sources of Cholesterol in the Body

The relationship between dietary cholesterol and cholesterol in the body is rather intricate. Simply speaking, dietary cholesterol only contributes a small portion of the cholesterol in the body. Majority of the cholesterol found in the body is made by our own liver. For healthy individuals, there is a self-regulatory mechanism in our body to help control the level of cholesterol.

Functions of Cholesterol

Cholesterol is an important part of the cell membranes. Besides, it is the material for synthesising vitamin D, bile and some hormones, such as sex hormones (e.g. testosterone) and adrenal hormones (e.g. cortisol).

Health Effects of Cholesterol

Many people think cholesterol is the "bad" guy as it increases the risk of cardiovascular diseases. In point of fact, cholesterol is vitally important in the body and its adverse health effects are found only if the level exceeds certain limit.

Cholesterol is carried by lipoprotein in the body. While flowing in the bloodstream, some cholesterol forms deposits in the walls of the blood vessels which may lead to atherosclerosis (hardening of the arteries) and in turn increases the risks of developing heart attacks and strokes.

It is worth noting that some evidence shows that intake of saturated fat and trans fat are more critical than dietary cholesterol in terms of the risk of cardiovascular diseases. In particular, some findings indicate that increasing intake of saturated fat may increase the production of cholesterol in the body. Therefore, reducing the intake of dietary cholesterol alone may not help lower the blood cholesterol level. For heart health purpose, besides dietary cholesterol, we should pay more attention to the saturated fat and trans fat intake.

Intake of Dietary Cholesterol and Saturated Fat

According to the Chinese Adequate Intake (AI), less than 10% of energy contribution should come from saturated fat, which means that there should be less than 22g of saturated fat from all food sources in a 2 000-kcal diet. As for dietary cholesterol, the reference intake is not related to the energy requirement (i.e. the amount of kcal in the diet) as it does not contribute to energy production in the body. It is suggested

食物中的膽固醇含量

食物(以每100克計，除非另有訂明)	膳食膽固醇(毫克)
雞蛋(1隻；~50克)	293
牛肚	104
豬膶/豬肝	288
蝦	181
墨魚	226
鮮貝/帶子	140
瑤柱/元貝	348

如需更多資料，請瀏覽食物安全中心網頁內的食物資料查詢系統

我們將會在下一期推出《營養素與健康》系列的末篇，探討與心臟健康有關的另一種營養素：鈉。

that an adult should consume less than 300 mg (a much lower order than saturated fat) of dietary cholesterol daily.

Cholesterol Contents in Foods

Food (per 100g, unless otherwise stated)	Dietary Cholesterol (mg)
Chicken egg (1 piece; ~50g)	293
Beef tripe	104
Pig liver	288
Shrimp	181
Cuttlefish	226
Scallop	140
Dried scallop	348

Please visit the Nutrient Information Inquiry System at the CFS's website for more information.

In the next issue which will be the last in this "Nutrient and Health" series, we will take a look at sodium, another nutrient that is related to heart health.

食物事故點滴
Food Incident Highlight

奶類中的苯甲酸

鑑於近日某期刊內有關中國內地奶類中的苯甲酸含量研究顯示，部分奶類及奶製品含有小量苯甲酸，遂引起社會討論苯甲酸在這些產品中的安全問題，以及是否有人刻意添加苯甲酸。

苯甲酸是本港和國際間廣為使用的食物防腐劑，其效用在酸性食物中發揮最佳，在奶製品等鹼性食物中則較差。正常使用苯甲酸不會損害人體健康，但對這種食物添加劑敏感的人則除外。不過，根據《食物內防腐劑規例》，苯甲酸在本港並非可在奶類及奶類飲品中使用的准許防腐劑。

奶類及奶製品天然含有小量苯甲酸。一般而言，正常進食含有小量苯甲酸的食物不會損害人體健康，故此市民對奶類及奶製品天然含有苯甲酸一事無須過分擔心。

Benzoic Acid in Milk

Recently, a journal article about a study on benzoic acid levels in milk in Mainland China revealed that low levels of benzoic acid were present in some milk and milk products, which sparked discussions on its safety in these products and whether it had been purposely added.

Benzoic acid is widely used in food products as a preservative both locally and internationally. It is most effective in acidic foods and is less effective in alkaline foods, such as dairy products. Its normal use is unlikely to cause adverse health effects, except for some allergic people who are sensitive to this food additive. However, according to the Preservatives in Food Regulations, benzoic acid is not a permitted preservative in milk and milk beverages in Hong Kong.

Low levels of benzoic acids occur naturally in milk and milk products. Generally, normal consumption of food containing low levels of benzoic acids will not pose adverse health effects. Therefore, there is no need of undue concern over the presence of naturally occurring benzoic acids in milk and milk products.

再談快速警報系統

自第三十一期的"食物事故點滴"專文刊出後，快速警報系統網頁增設了更多資訊。

有關網頁增設了涉及主要食物安全事故的摘要，而首份摘要是有關美國受沙門氏菌污染的花生及花生製品回收行動。此外，網頁又加入了海外有關當局的超連結。

為取得食物安全事故的最新詳情，食物業界宜利用上述網頁內的登記表格免費登記成為快速警報系統用戶。如一旦管有涉及回收行動的食品時，應立即通知食物安全中心。此外，網頁內亦提供了快速警報信息樣本。

More on the Rapid Alert System

Further to the Food Incident Highlight article on the Rapid Alert (RA) System in the 31st issue, we have expanded the RA webpage to include more information.

The expanded webpage now includes summaries of major food safety incidents. The first summary relates to the recall of peanuts and peanut products contaminated with *Salmonella* in the USA. We have also added hyperlinks of the relevant overseas authorities.

Members of the food trade are encouraged to sign up with the free RA System with the enrolment form in the above webpage in order to keep up-to-date with details on the latest food incidents and to inform the CFS immediately if the concerned products are available. A sample of the RA message is also available on the same page.

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

風險傳達工作一覽（二零零九年三月） Summary of Risk Communication Work (March 2009)	數目 Number
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