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E. coli O157:H7 Outbreak Associated with Bagged Fresh Spinach in the US

食物安全中心風險傳達組
科學主任游天頌先生報告

Reported by Mr. Arthur YAU, Scientific Officer,
Risk Communication Section, Centre for Food Safety

事故摘要

由於美國多個州爆發O157:H7型大腸桿菌事故，引致一人死亡及多人送院治療，美國食物及藥物管理局遂於二零零六年九月十四日呼籲消費者切勿進食袋裝新鮮菠菜。食物安全中心在得悉此事後，立即呼籲本港消費者切勿進食此類美國產品。此外，又與美國駐港總領事館聯絡，要求暫停向本港進口美國袋裝新鮮菠菜產品。食物安全中心亦要求本地零售及入口商，停止入口及售賣來自美國的袋裝菠菜產品。

其後，美國食物及藥物管理局不時提供此事的最新發展的資料。該局表示，受影響的菠菜來自加州San Juan Bautista的Natural Selection Food LLC (NS Food)公司，並提醒公眾該公司已回收日期批號為十月一日或之前的旗下不同牌子的所有菠菜產品。此外，由於多間公司選用NS Food公司的菠菜，該國還有另外五次回收行動。

什麼是O157:H7型大腸桿菌？

O157:H7型大腸桿菌是一種最常見於牛隻的大腸桿菌，但亦可存在於人類和鹿等哺乳類動物的腸道內。此種可致病的大腸桿菌會產生名為一型及二型志賀毒素的劇烈毒素。受影響的人可能會出現嚴重水狀腹瀉、帶血腹瀉、發燒、腹絞痛或嘔吐等腸胃不適徵狀。其潛伏期可以由一至十日(中位數為三至四日)。約8%的病人可能引致溶血尿毒症，而此症徵狀是急性腎衰竭。五歲以下的幼童出現溶血尿毒症等併發症的機會較大。1至5%的的溶血尿毒症患者或會死亡。雖然海外其他地方多次發生食物污染引致的O157:H7型大腸桿菌事故，但這類感染個案在本港卻較少見，只得零星數宗。根據衛生署衛生防護中心的記錄顯示，由一九九八年至二零零五年，本港只有六宗零星的O157:H7型大腸桿菌個案，當中一宗屬於外地感染個案。其中只有一宗是溶血尿毒症。截至二零零六年九月，本年並沒有發現O157:H7型大腸桿菌感染個案。

食物安全中心有抽取在本港市面出售的即食食物樣本作O157:H7型大腸桿菌測試。在二零零四至二零零六年六月，一共抽取了585個樣本，全部結果令人滿意。(表一)

Summary of Incident

On 14 September 2006, the US Food and Drug Administration (FDA) advised consumers not to consume bagged fresh spinach in response to an outbreak of *E. coli* O157:H7 that caused one death and multiple hospitalisations in multiple states. Upon learning the incident, the Centre for Food Safety (CFS) immediately advised local consumers not to consume the type of product from the US. The CFS also contacted the US Consulate General and requested that the export of bagged fresh spinach products from the US to Hong Kong be temporarily suspended. Local retailers and importers were also asked to stop import and sale of bagged spinach products from the US.

The FDA subsequently issued more updates on the issue. It stated that the affected spinach was traced back to Natural Selection Food LLC (NS Food) of San Juan Bautista, California. The FDA also reminded the public that NS Food had recalled all spinach products under multiple brand names with a date code of October 1 or earlier. There had been five other recalls from different companies because they used NS Food's spinach.

What is *E. coli* O157:H7?

E. coli O157:H7 is a strain of *Escherichia coli* that is most commonly found in cattle, but also found in the intestines of humans and mammals like deer. This pathogenic *E. coli* strain can produce potent toxins called Shiga toxin 1 and 2. Affected people may develop gastro-intestinal symptoms that include severe watery diarrhoea, bloody diarrhoea, fever, abdominal cramps or vomiting. The incubation period ranges from 1-10 days (median 3-4 days). About 8% of the patients may develop haemolytic uraemic syndrome (HUS), which is characterised by acute kidney failure. Children under five years old have a higher risk of developing complications such as HUS. Some 1-5% of cases of *E. coli* O157:H7 infection may die. Although recurring outbreaks of *E. coli* O157:H7 as a result of food contamination occur overseas, such infections are uncommon in Hong Kong and local cases appeared sporadically. From 1998 to 2005, the Centre for Health Protection of the Department of Health recorded six sporadic human infections of *E. coli* O157:H7, including one imported case. One of them presented as HUS. As of September 2006, no case of *E. coli* O157:H7 infection was reported in 2006.

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焦點個案
Incident in Focus

表一：抽取作O157:H7型大腸桿菌測試的即食食物樣本

年份	抽取即食食物樣本數目	不滿意樣本數目
2004	216	0
2005	244	0
2006 (一月至六月)	125	0

資料來源：香港食物安全中心

常見感染途徑

食物和水可能因接觸到牛糞而受O157:H7型大腸桿菌污染。農作物可以在田中和肉類製品可以在屠房內受到污染。因此須加倍留意**未經徹底煮熟和生的食物**(例如碎肉、漢堡包、未經巴士德消毒法處理的奶類製品、蔬菜和苜蓿芽菜等)。進食未經徹底煮熟或生的食物較易染病，因為只需少量的細菌即可致病。不過，烹煮食物卻能殺死細菌和預防疾病。此外，良好的個人衛生習慣及正確的處理食物方法，亦可盡量減低透過口糞途徑傳播這種細菌的機會。

給業界的意見

業界人士應確保供生吃的蔬菜購自可靠的供應商，並適宜供人食用。此外，供生吃的新鮮蔬菜應在乾淨的流動自來水下徹底洗淨。

給市民的意見

洗菜前，應先摘去如生菜和包心菜等蔬菜的外葉，然後浸在水中一小時，再以乾淨的流動自來水徹底洗淨，以除去表面的污染物。

高風險人士(即幼童、長者、孕婦和免疫力較弱的人)應避免進食含有生的蔬菜的食物(例如沙律、椰菜沙律和醃菜等)。為減低染病機會，蔬菜應徹底洗淨和煮熟才進食。此外，亦應注意單靠徹底洗淨蔬菜不足以除去所有微生物污染。徹底煮熟蔬菜才是確保其安全的有效方法。

更多資料

讀者如有興趣更深入了解此事，請登入下列相關網頁。

- [美國食物及藥物管理局](#) (只有英文版)
- [食物安全中心的風險簡訊——食用未經烹煮的蔬菜的細菌性食物安全問題](#)
- [食物安全中心的微生物風險評估——沙律](#)

The CFS took samples of ready-to-eat (RTE) food for *E. coli* O157:H7 examination. From 2004 to June 2006, 585 samples were taken and all results were satisfactory.(Table 1).

Table 1: Ready-to-eat food samples taken for *E. coli* O157:H7 examination

Year	No. of RTE food samples taken	No. of unsatisfactory samples
2004	216	0
2005	244	0
2006 (Jan to Jun)	125	0

Source: Centre for Food Safety, Hong Kong

Common Source of Infection

Food and water can be contaminated with *E. coli* O157:H7 due to contact with cattle faeces. Contamination of agricultural products can occur in the field and meat products in the abattoir. **Undercooked and raw foods**, such as minced beef, hamburgers, unpasteurized dairy products, vegetables and alfalfa sprouts etc. are of particular concern. Consumption of undercooked or raw food may pose a higher risk of illness as only a small number of the bacteria are needed to cause illness. On the other hand, cooking is effective in killing the bacteria and preventing illness. Furthermore, good personal hygiene and proper food handling techniques will minimise the chance of transmitting this bacteria via the faecal-oral route.

Advice to the Trade

Members of the trade should ensure that they obtain vegetables for raw consumption from reliable sources and that the vegetables are fit for human consumption. Fresh vegetables for raw consumption should be thoroughly washed under clean running tap water.

Advice to the Public

When washing vegetables, the outer leaves from vegetables such as lettuce and cabbage should be discarded prior to washing. They should then be immersed in water for an hour and washed thoroughly with clean running water to remove surface contamination.

People at a higher risk (i.e. young children, elderly people, pregnant women and persons with weakened immune systems) should avoid eating food containing raw vegetables (e.g. salad, coleslaw, pickled vegetables etc.). Vegetables should be thoroughly washed and cooked before consumption in order to reduce the likelihood of disease. It should be noted that thorough washing alone may not be able to remove all the microbiological contamination. Thorough cooking is an effective way to ensure food safety.

Further Information

For readers who are interested in learning more about the incident, please visit the following web pages for further information.

- [US FDA "Spinach and E. coli Outbreak"](#)
- [FEHD Risk in Brief - Microbiological Food Safety of Raw Vegetables Intended for Human Consumption](#)
- [FEHD Microbiological Risk Assessment - Salads](#)

風險傳達 工作一覽 Summary of Risk Communication Work

風險傳達工作一覽 (二零零六年九月) Summary of Risk Communication Work (September 2006)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	38
公眾查詢 Public Enquiries	113
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生物危害概論

Overview of Biological Hazards

食物安全中心風險評估組
科學主任朱源強先生報告

Reported by Mr. Johnny CHU, Scientific Officer,
Risk Assessment Section, Centre for Food Safety

危害

我們在創刊號中說過，凡食物所含的物質或媒介，具有對消費者健康構成不良影響的潛力，均歸類為“危害”。食物危害可分為生物、化學和物理三大類。今期我們將會詳細談一談生物危害。

生物危害

生物危害指能夠對人造成不良影響的**生物媒介**。常見的生物危害包括細菌、病毒和寄生物。

致病細菌

細菌是有生命的單細胞生物，一般認為是食源性疾病最主要的致病媒介。細菌會在溫暖、濕潤、蛋白質豐富及酸度偏低的食物中迅速滋長。牛奶、帶殼的蛋、禽肉、魚類、肉類和貝介類水產都是有利細菌滋長的常見食物。雖然大部分細菌都對我們無害，但有些(例如沙門氏菌和李斯特菌)卻會在人體內生存並大量繁殖，令人生病，有些(例如金黃葡萄球菌和蠟樣芽孢桿菌)則可在食物中產生毒素，人若吃下食物和當中的毒素，便會病倒。不過，單憑食物內有細菌這一點未必會引致疾病，食物中所含的細菌量才是關鍵所在。下表顯示本港在二零零五年引致食物中毒的三大致病細菌：

食物中的細菌總數通常用以表示食物的衛生水平。細菌數量本身並不屬於食物危害。同樣，食物含有大腸桿菌表示食物曾受糞便直接或間接污染。單憑食物含有大腸桿菌未必表示會對人造成不良影響。
The total number of bacteria in a food is usually employed to indicate the sanitary quality of foods and itself is not considered as a food hazard. Likewise, occurrence of E. coli in food indicates direct or indirect faecal contamination of food and its mere presence may not mean it will cause harmful effects.

致病細菌	涉及的食物	導致身體健康的成年人生病所需的細菌數目*
副溶血性弧菌	<ul style="list-style-type: none"> 生或未經徹底煮熟的海產 受生海產污染的即食食物 	每克食物含有多於 10^6 個副溶血性弧菌
沙門氏菌	<ul style="list-style-type: none"> 生或未經徹底煮熟的蛋或蛋類製品 未經徹底煮熟的禽肉 	通常為 10^2 至 10^3 個沙門氏菌，但有時會少至 10^1 至 20 個沙門氏菌
金黃葡萄球菌	<ul style="list-style-type: none"> 受污染後存放於室溫內一段長時間的即食食物 	每克食物須含有 10^5 個金黃葡萄球菌才可產生足夠的毒素

*資料來源：美國食物及藥物管理局編製的惡菌書(Bad Bug Book)及新西蘭食物安全局編制的微生物病原資料單(Microbial Pathogen Data Sheets)

病毒

病毒是結構非常簡單的細小生物，脫離有生命的細胞後便不能繁殖，因此不會在食物中或食物表面上繁殖。病毒會透過食物業從業員的不良衛生習慣而污染食物，或存在於

O157:H7型大腸桿菌近日導致美國爆發因進食生菜引起的食物中毒事故。這種致病菌只需很少分量(可能少至十個致病菌)，便可傳播疾病。在本港，涉及O157:H7型大腸桿菌的食源性疾病較少見。由一九九八年至二零零六年九月期間，共呈報了六個個案。

A particular type of *E. coli*, *E. coli* O157:H7 recently caused an outbreak of food poisoning involving consumption of raw spinach in the US. The infectious dose of the pathogen is low, probably as low as 10 organisms. In Hong Kong, foodborne disease involving *E. coli* O157:H7 is uncommon. From 1998 to September 2006, a total of six cases were reported.

Hazards

In the first issue of the newsletter, we have mentioned that a “hazard” can be classified as a substance or agent present in food with the potential to cause an adverse health effect to the consumer. Food hazards can be divided into three main categories: biological, chemical and physical. In this issue, we are going to give you some more information on biological hazards.

Biological Hazards

Biological hazards are **biological agents** that have the capacity to cause harmful effects in humans. Common biological hazards include bacteria, viruses and parasites.

Pathogenic Bacteria

Bacteria are living single-celled organisms and are generally considered to be the most important causative agents of foodborne illnesses. Bacteria grow fast in foods that are warm, moist, protein-rich and low in acid. Milk, shell eggs, poultry, fish, meat and shellfish are common food items that support the growth of bacteria. Most bacteria are not harmful to us while some can make people ill by living and multiplying inside human bodies (e.g. Salmonella, Listeria monocytogenes). Others (e.g. *Staphylococcus aureus*, *Bacillus cereus*) produce toxins in foods and people fall ill because of the toxins when they eat the foods. However, the mere presence of the organism in food may not cause the disease. The amount of organism present is important. The table below shows the top 3 pathogenic bacteria causing food poisoning in 2005 in Hong Kong:

Pathogenic bacteria	Foods involved	Number of bacteria required to cause disease in healthy adults*
<i>Vibrio parahaemolyticus</i>	<ul style="list-style-type: none"> Raw or under-cooked seafood Ready-to-eat foods contaminated by raw seafood 	Greater than 10^6 organisms per gram of food
<i>Salmonella</i>	<ul style="list-style-type: none"> Raw or undercooked egg and egg products Undercooked poultry 	Usually 10^2 to 10^3 organisms but sometimes as few as 15 to 20 organisms
<i>Staphylococcus aureus</i>	<ul style="list-style-type: none"> Ready-to-eat foods that have been contaminated and then kept at ambient temperature for a prolonged period of time 	Greater than 10^5 organisms per gram of food are required to produce enough toxin

*Source: Bad Bug Book from the US FDA and Microbial Pathogen Data Sheets from the New Zealand Food Safety Authority

Viruses

Viruses are very simple and small organisms that cannot reproduce outside a living cell. Therefore, they do not multiply in or on foods. Viruses can contaminate food through foodservice workers' poor hygiene, and can be present in contaminated food and water supplies, or shellfish harvested from sewage-contaminated waters. The infective dose of most viruses is extremely small, sometimes as few as 10 virus particles. Two of the commonest foodborne viruses in Hong Kong are:

- Norovirus
- Hepatitis A virus

食物安全平台

Food Safety Platform

受污染的食物和水源，或產自受污水污染水域的貝介類水產。大部分病毒只需極少量(有時少至十個病毒粒子)便可傳播疾病。本港最常見的兩種食源性病毒分別是：

- 諾沃克病毒
- 甲型肝炎病毒

寄生物

寄生物是寄居在另一有生命的生物(稱為寄主)體內或身上的生物，包括單細胞生物和昆蟲。人們可能會因飲用或進食受污染的水和食物(例如生的蔬菜)感染到單細胞寄生物(例如藍氏賈第鞭毛蟲)。至於寄生蟲，其生命周期較為複雜。幼蟲需透過動物寄主(例如淡水魚和淡水螺)才能感染到最終寄主(例如人類、狗和貓)。人們可能會因吃下未經徹底煮熟的肉類、淡水魚和淡水螺而感染到鯊蟲、中華肝吸蟲和廣州管圓線蟲等寄生蟲。

簡單的管理風險守則

防止污染是提升食物安全的首要原則。此外，必須將食物**冷藏**，以防細菌繁殖至危險水平。最後，食物應徹底煮熟才進食，以殺死食物中可能存在的致病菌。

Parasites

Parasites are organisms that live in or on another living organism, which is called the host. Parasites include single-celled organisms and worms. Human beings may be infected with single-celled parasites (e.g. *Giardia lamblia*) through consumption of contaminated water and food such as raw vegetables. Parasitic worms have more complex life cycles. Immature worms need to pass through an animal host (e.g. freshwater fish and snails) before it can infect the final host (e.g. human beings, dogs and cats). Human beings may get infected with parasitic worms through consumption of undercooked meat, freshwater fish and freshwater snails. Examples are tapeworms, *Clonorchis sinensis* and *Angiostrongylus cantonensis* respectively.

Simple Rules to Manage the Risk

Prevention of contamination is the most important control factor to enhance food safety. It is also important to keep foods at **refrigerated temperature to prevent bacteria from growing** to hazardous levels. Finally, **foods should be cooked thoroughly** before consumption in order to destroy pathogens that may be present.

食物事故點滴

Food Incident Highlight

魚類中的砷

近期本港有人關注到魚類(包括秋刀魚)中的砷含量。

砷是蘊藏於地殼的一種準金屬天然物質。作為天然的污染物，食物中的砷可分為有機和無機兩類，而無機砷的毒性特別受關注。不過，魚類中的砷通常為毒性較輕微的有機砷。人們主要從食物(尤其是水產)攝入砷。

慢性砷中毒可引致皮膚病患，神經損害，皮膚癌和血管病變。

食物環境衛生署在二零零二年進行的風險評估研究發現，攝取量一般和偏高的中學生從食物中攝取砷的水平遠低於國際食物安全機關訂定的安全參考值。因此，飲食習慣一般的人出現砷中毒的機會不大。

根據本港以往的監察結果，極少魚類樣本超出本港對砷的規管標準，市民無須過份擔心。食物安全中心將會繼續密切留意本港食物(尤其是海產)中的砷含量。不過，市民應保持均衡飲食，以免因偏食而攝取過量污染物。

Arsenic in Fish

Some concerns were raised recently over arsenic levels detected in fish, including *Cololabis saira* (also commonly known as pacific saury or sanma).

Arsenic is a metalloid present naturally in the earth's crust. It exists as a natural contaminant in both organic and inorganic forms in foods, with the inorganic form of particular toxicological concern. However, arsenic in fish is usually present in its less toxic organic form. The primary route of arsenic exposure in humans is mainly through ingestion of foods, especially aquatic foods.

Chronic toxicity due to arsenic may lead to skin lesions, nerve damage, skin cancer and diseases of the blood vessels.

Risk assessment study conducted by the Food and Environmental Hygiene Department in 2002 found that dietary exposure to arsenic for both average and high consumers of secondary school students fell well below the safety reference value established by international food safety authorities. Therefore, people with a usual dietary habit was unlikely to experience toxicological effects of arsenic.

According to previous local surveillance results, very few fish samples exceeded local regulatory standard for arsenic and there is no cause for undue concern. The Centre for Food Safety will continue to monitor arsenic content of local foodstuffs, seafood in particular. The public is advised to take a balanced diet so as to avoid excessive exposure to contaminants from a small range of food items.



海產中的水銀

本港一所大學最近發表的一項研究發現，初生嬰兒血液中的水銀(汞)含量偏高，並認為孕婦的吃魚量與嬰兒體內的水銀含量直接成正比。

水銀是一種存在於環境中的天然物質，屬於食物中的天然污染物，可能會對神經系統造成損害，特別是正在發育的腦部。胎兒、嬰兒和幼童更易受這些毒性影響。

食物環境衛生署以往就中學生進行的風險評估研究認為，他們不會因為從食物攝取水銀而導致嚴重中毒。此外，又確定魚類是他們攝取水銀的主要膳食來源，而劍魚和吞拿魚等體型較大的捕獵魚類水銀含量最高。

我們建議市民應進食適量的魚類，因為魚類含豐富的優質蛋白質，而其飽和脂肪亦低。不過，孕婦、嬰兒和幼童則應避免進食過量的捕獵魚類。如欲取得更多資料，請登入中心網頁。

Mercury in Seafood

A local university has recently published a study which found that high levels of mercury were detected in newborn infants' blood and considered that the amount of fish consumed by pregnant women was directly proportional to the level of mercury in infants.

Mercury, an element that naturally exists in the environment, is considered as a natural contaminant of food. It may cause adverse effects to the nervous system, especially the developing brain. Foetuses, infants and young children are more sensitive to such toxic effects.

Previous risk assessment studies conducted by the Food and Environmental Hygiene Department for secondary school students concluded that major toxicological effects of mercury were not expected via dietary exposure. Fish was identified as the main dietary source of mercury and the large predatory fish, such as swordfish and tuna, had the highest concentrations.

Moderate consumption of fish is recommended as it is an excellent source of high quality protein and low in saturated fat. However, pregnant women, infants and young children should avoid consuming excessive amount of predatory fish. Please visit the [CFS website](#) for further information.