

食物安全焦點

Food Safety Focus



食物安全中心
Centre for Food Safety

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焦點個案 Incident in Focus

氨基甲酸乙酯與酒類

Ethyl Carbamate and Alcohol

食物安全中心

風險傳達組

科學主任鄧紹平博士報告

Reported by Dr. Anna S.P. TANG, Scientific Officer,
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食物安全中心(中心)在上個月公佈有關本地發酵食物和飲品的氨基甲酸乙酯檢測含量的研究結果。該項研究發現,不同的本地發酵食物和飲品的氨基甲酸乙酯含量不一,某些酒精飲品(如黃酒、日本清酒和梅酒)的氨基甲酸乙酯含量相對較高。此外,在研究涵蓋的各種類別中,“酒精飲品”是飲酒人士從膳食攝入氨基甲酸乙酯的主要來源。本文將會詳述酒類的氨基甲酸乙酯情況。

什麼是氨基甲酸乙酯?

氨基甲酸乙酯又名尿烷,是發酵食物和酒精飲品在發酵或貯存過程中天然產生的污染物。氨基甲酸乙酯過去曾用於人類醫藥用途,但因為含有毒性且療效欠佳,現已禁用。不同的酒精飲品檢出的氨基甲酸乙酯含量不一(見圖1),例如烈酒(特別是由櫻桃、杏和梅等核果製造的烈酒)的含量一般較高,而啤酒的含量則偏低。不同種類的酒精飲品的氨基甲酸乙酯含量差異很大,例如過往研究報告中的水果拔蘭地氨基甲酸乙酯含量平均直達啤酒的600倍以上。

Last month, the Centre for Food Safety (CFS) released the results of a study which examined the level of ethyl carbamate (EC) in local fermented foods and beverages. The study found that EC was present in varying amounts in different local fermented food and beverage items. In some alcoholic beverages such as yellow wine, sake and plum wine, relatively higher levels of EC were found. As a group, “alcoholic beverages” was identified as the main dietary source of EC for alcohol drinkers. In this article, we will talk more about alcohol in relation to EC.

What is EC?

Ethyl carbamate also known as urethane, is a contaminant naturally formed in fermented foods and alcoholic beverages during the fermentation process or during storage. EC has also been used as human medicine which is now banned due to toxicological concerns and lack of efficacy. Variable levels of EC have been found in different alcoholic beverages (Figure 1). For example, spirits, particularly those made from stone-fruits such as cherries, apricots or plums, usually contain higher amount of EC while beers contain low levels. EC levels can differ greatly between different types of alcoholic beverages e.g. the mean EC contents in fruit brandy in some reports were over 600 times that of beer.

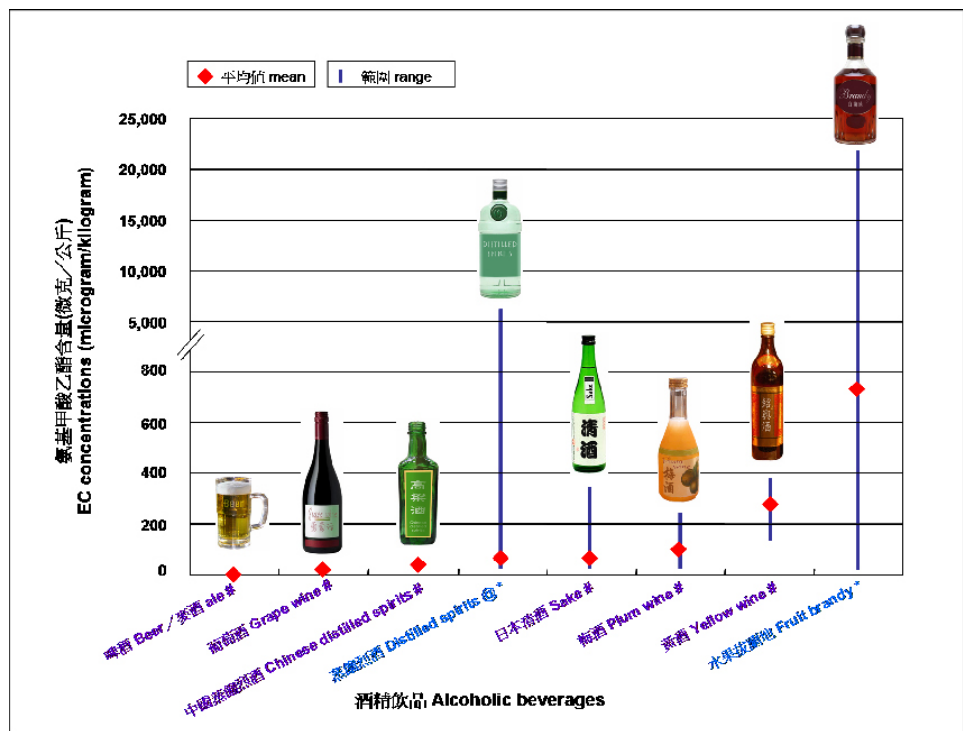


圖1 各類酒精飲品的氨基甲酸乙酯含量

Figure 1. Ethyl carbamate (EC) levels in various types of alcoholic beverages

上述氨基甲酸乙酯含量數字來自中心進行的有關本地發酵食物含氨基甲酸乙酯的情況的風險評估研究所測試的有限樣本數目
Levels of EC drawn from a limited number of samples tested in the risk assessment study on Ethyl Carbamate in Local Fermented Foods conducted by the CFS

* 其他國家的報告所載的氨基甲酸乙酯含量 Levels of EC reported overseas (WHO Food and Nutrition Paper 82, 2006; EFSA, 2007)

◎ 蒸餾烈酒(不包括水果拔蘭地) Distilled spirits excluding fruit brandy



酒精飲品中氨基甲酸乙酯的產生

酒精飲品中的各種物質及其分解物經發酵過程後均可產生氨基甲酸乙酯。這些前體物質(如尿素、氰酸酯和瓜氨酸)與乙醇發生化學作用,在酒精飲品中產生氨基甲酸乙酯,而產生的數量取決於光線和高溫兩大要素。

氨基甲酸乙酯對健康的影響

食物內的氨基甲酸乙酯可能令人類患癌因而引起公眾的關注。實驗顯示,氨基甲酸乙酯可令實驗動物患上各類癌症。二零零七年,國際癌症研究機構把氨基甲酸乙酯重新分類為第2A組(“可能令人類患病的物質”)。

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)曾在二零零五年進行有關氨基甲酸乙酯的評估,認為經食物(不包括酒精飲品)攝入的氨基甲酸乙酯分量,對健康的影響不大,但經食物和酒精飲品攝入的氨基甲酸乙酯總量,則可能對健康構成潛在風險。專家委員會建議採取措施,減少一些酒精飲品的氨基甲酸乙酯含量。

注意要點

- 食物內的氨基甲酸乙酯可能令人類患癌因而引起公眾的關注。
- 把酒精飲品貯存在較暗和較低溫(如在攝氏20度或以下)的地方,可大大減低酒內產生氨基甲酸乙酯的分量。
- 市民應保持均衡飲食,避免飲用過量酒精飲品。

本港市民從膳食攝入氨基甲酸乙酯的分量

中心根據研究檢測到的氨基甲酸乙酯含量及二零零五至二零零七年香港市民食物消費量調查初步所得的消費量數據,進行一項風險評估。結果發現,一般市民從本地發酵食物和飲品攝入的氨基甲酸乙酯的分量對健康構成的風險不大。不過,對於長期飲用大量酒精飲品的消費者(如經常喝蒸餾烈酒[每日超過270毫升]、梅酒[每日超過76毫升]、葡萄酒[每日超過250毫升]的消費者),則不能排除因攝入較高分量的氨基甲酸乙酯而可能對健康構成風險。

減少酒精飲品的氨基甲酸乙酯含量

把酒精飲品貯存在較暗和較低溫的地方,可大大減低氨基甲酸乙酯含量。業界在運送及貯存酒精飲品期間,應注意保持正確的低溫環境,盡量維持溫度於攝氏20度或以下,切勿超過攝氏38度。為保持葡萄酒的感官特質和品質,大部分酒窖的溫度都保持在攝氏20度以下,這個溫度應可減低酒內產生氨基甲酸乙酯的幅度。

中心與業界緊密合作,一同制訂了有關在貯存及運送期間減少酒精飲品的氨基甲酸乙酯含量的指引。該指引適用於酒精飲品的進口商、分銷商、批發商和零售商。業界應努力減少酒精飲品的氨基甲酸乙酯含量。

給業界的建議

1. 製造商應遵守優良製造規範。制定緩解措施,以減少酒精飲品的氨基甲酸乙酯含量,例如確定和減少氨基甲酸乙酯前體的分量。
2. 使用合適的容器貯存酒精飲品,避免光線照射。
3. 進口商、分銷商、批發商及零售商在運送和貯存酒精飲品時,應盡量避免飲品暴露在高溫和強光下,注意保持正確的低溫環境,盡量維持溫度於攝氏20度或以下,切勿超過攝氏38度。
4. 向可靠的供應商採購酒精飲品。
5. 以先入先出的原則處理存貨。

給市民的建議

1. 保持均衡飲食,切勿偏食,避免飲用過量酒精飲品。
2. 把酒精飲品貯存在陰涼及較暗的地方。
3. 避免積存過多酒精飲品,盡量縮短貯存時間。

Formation of EC in Alcoholic Beverages

Ethyl carbamate can be formed from various substances present in alcoholic beverages and their break-down products as a result of the fermentation process. These precursor substances, e.g. urea, cyanate and citrulline, react with ethanol to form EC in alcoholic beverages. The amount of EC formed depends on the key factors of light exposure and elevated temperature.

Health Effects of EC

Public concerns regarding EC in foods are related to its potential to cause cancer in human. EC has been observed to cause various types of cancer in experimental animals. In 2007, the International Agency for Research on Cancer (IARC) up-graded the classification of EC to Group 2A “probably carcinogenic to humans”.

The Joint Food and Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA) evaluated EC in 2005. It concluded that intake of EC from foods excluding alcoholic beverages would be of low concern. However, dietary exposure to EC from both food and alcoholic beverage was of concern and measures to reduce concentrations of EC in some alcoholic beverages were recommended.

Key Points to Note

- Public concerns regarding EC in foods are related to its potential to cause cancer in human.
- Formation of EC in alcoholic beverages can be reduced significantly by keeping them at low light conditions and at lower temperatures e.g. at or below 20°C.
- Members of the public should take a balanced diet and avoid overindulgence of alcoholic beverages.

Local Dietary Exposure to EC

A risk assessment was conducted by the CFS based on the EC levels measured in our study and the preliminary consumption data of the Population-based Food Consumption Survey 2005 - 2007. It was found that for the general population, dietary exposure to EC from consumption of fermented foods and beverages is unlikely to pose health concerns. However, health risk of EC cannot be ruled out for high consumers of alcoholic beverages, e.g. distilled spirits (>270 mL/day), plum wine (>76 mL/day), grape wine (>250 mL/day) on a regular basis.

Reduce EC Levels in Alcoholic Beverages

Formation of EC can be reduced significantly when alcoholic beverages are kept at low light conditions and at lower temperatures. During transport and storage, care should be taken to maintain the correct cold chain preferably at or below 20°C and critically not above 38°C. At the temperatures at which most wine cellars are maintained to keep the sensory properties and qualities of grape wine (i.e. below 20°C), less increment in EC content is expected.

The CFS has worked closely with the trade to devise the [Guidelines on reducing the level of ethyl carbamate in alcoholic beverages during storage and transport](#) which are applicable to importers, distributors, wholesalers and retailers of alcoholic beverages. Members of the trade should make efforts to reduce the level of EC in alcoholic beverages.

Advice to the Trade

1. Manufacturers should follow Good Manufacturing Practice (GMP). Develop mitigation measures to reduce the levels of EC in alcoholic beverages, e.g. identifying and reducing the amount of precursors.
2. Use proper containers to protect alcoholic beverages from light exposure.
3. Importers, distributors, wholesalers and retailers should minimise heat and light exposure during transportation and storage of alcoholic beverages. Special care should be taken to maintain the correct cold chain preferably at or below 20°C, and critically not above 38°C.
4. Obtain alcoholic beverages from reliable suppliers.
5. Keep stock according to the first-in-first-out principle.

Advice to the Public

1. Maintain a balanced diet. Avoid overindulgence of alcoholic beverages.
2. Store alcoholic beverages in a cool place under low light conditions.
3. Avoid stocking up excessive alcoholic beverages to minimise the duration of storage.

有機食物的安全性 Organic Food Safety

食物安全中心
風險評估組
科學主任周淑敏女士報告

Reported by Ms. Shuk-man CHOW, Scientific Officer,
Risk Assessment Section,
Centre for Food Safety

我們在過去數期曾介紹生物科技可為我們提供品質更佳的食物。然而，某些生物科技(如基因工程)的運用或會被視為人類干擾大自然的行為。想吃得天然的人可能會選擇有機食物。

有機農業和有機食物

在有機農業中，食物是按確保生產過程更加“天然”的標準生產，其間不會使用合成除害劑、化學肥料、抗生素、生長促進劑、來自非有機來源的食物添加劑，以及基因改造和輻照技術(一種用以殺死細菌的輻射技術)。(見圖1)

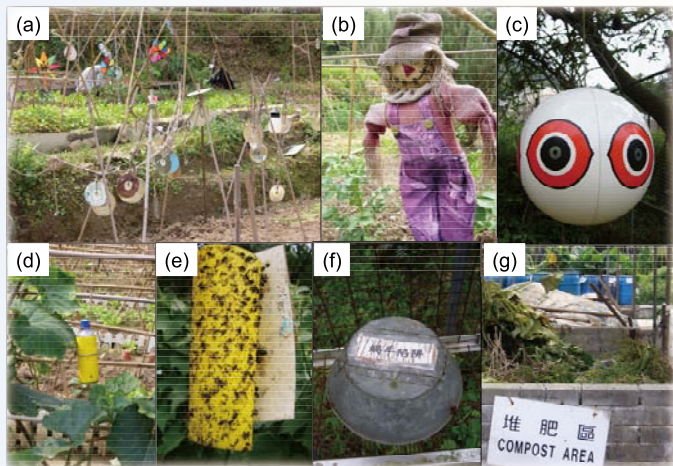


圖1. 本地有機農場: (a-c) 驅鳥裝置; (d-f) 捕蟲陷阱; (g) 堆肥區
Figure 1. Local organic farms: (a-c) Bird scarers; (d-f) Traps for pest control; (g) Compost area
[圖片由鍾可欣小姐提供 Illustrations by courtesy of Miss CHUNG Ho yan]

有機農業不會使用上述合成農用產品及人工技術，取而代之是利用輪作、堆肥和生物防治蟲害方法，以保持土壤生產力，為植物供應養分和控制昆蟲、雜草及其他害蟲。在有機畜牧業中，動物是以有機飼料餵飼，而飼養過程不會使用或減少使用抗生素、生長激素和其他獸藥。此外，認證機構會委派檢查員訪查農場，以確保農場一直妥善遵從有機生產的標準。為使消費者在零售層面易於識別，在出售時標榜“有機”的食物一般會在包裝上附上有機標籤。(見圖2)

有機食物可帶來的好處

人們選購有機食物的原因各有不同，例如消費者可能認為有機生產對自然環境和動物福利較好；進食有機食物可減少攝入殘餘除害劑和添加劑；又或消費者認為有機食物比非有機食物較健康和較有營養價值。

營養價值

不過，最近由英國食物標準局委託進行的一項評估(只有英文版)卻顯示，以有機方式或傳統方式生產的農作物和畜牧產品的營養成分大致相若，目前並無證據顯示有機食物可提供更多營養。除了英國的研究，由法國和瑞典食物安全當局進行的另外兩項獨立評估，對有機食物的營養價值也有類似的看法。

低水平的殘餘合成化學物

至於化學物方面，如上文所述，有機農業不會使用化學除害劑、除草劑和獸藥等合成農用產品。因此，有機農作物的殘餘合成化學物含量可能較低。

有機食物的潛在安全問題

受霉菌毒素污染

由於有機生產不得使用合成殺菌劑，因此有人認為相比於傳統方式種植的農作物，有機農作物可能較容易受真菌感染和含有較多霉菌毒素。

As introduced in the past issues, the application of biotechnology has the potential to provide us with food of better quality. However, the use of certain biotechnologies, e.g. genetic engineering, is sometimes considered as a kind of human interference with nature. People who want to eat naturally may choose to go organic.

Organic Farming and Organic Food

In organic farming, food is produced according to standards designed to keep production more “natural”. Synthetic pesticides, chemical fertilisers, antibiotics, growth promotants, and food additives derived from non-organic sources, as well as genetic modification and irradiation (a form of radiation used to kill bacteria) are excluded. [Figure 1]

In place of synthetic inputs, organic agriculture relies on crop rotations, composting, as well as biological pest control to maintain soil productivity, supply plant nutrients and control insects, weeds and other pests. In organic animal husbandry, animals are fed on organic feeds and raised without or by reduced use of antibiotics, growth hormones and other veterinary medicines. Inspectors will also be appointed by certification bodies to visit farms to ensure that the organic production standards have been properly followed. To facilitate consumers' easy identification at retail level, food sold as “organic” usually bears an organic label on its package. [Figure 2]



圖2. 常見於本地有機蔬菜的有機標誌
Figure 2. Organic logos commonly found on local organic vegetables

Potential Benefits of Organic Food

There are many different reasons for people to choose to buy organic food. For example, consumers may think that organic production is better for the environment and animal welfare. Eating organic is one way to reduce the intake of pesticide residues and additives. Consumers may also choose to buy organic food because they believe that it is healthier and more nutritious than non-organic one.

Nutritional value

A recent review commissioned by the U.K. Food Standards Agency (FSA), however, showed that the nutrient contents of organically and conventionally produced crops and livestock products are broadly comparable and there is no evidence of any additional nutritional benefit from eating organic. Besides the U.K. study, two other independent reviews conducted by French and Swedish food safety authorities also share similar views on the nutritional value of organic food.

Low level of synthetic chemical residues

With respect to chemicals, as mentioned earlier, synthetic agricultural inputs such as chemical pesticides, herbicides and veterinary medicines are refrained from use in organic agriculture. Therefore, it is likely that organic produce will have lower concentrations of synthetic chemical residues.

Possible Safety Concerns of Organic Food

Contamination by mycotoxins

Since synthetic fungicides are not allowed in organic production, it has been suggested that organic produce may be more susceptible to fungal infection and contaminated with higher levels of mycotoxins compared to conventionally grown crops.

Contamination by microorganisms

The organic way of food production has also been suggested to present a higher risk of microbial contamination. Organic agriculture uses composted manures as fertilisers. The produce and nearby water may be contaminated with pathogen if the manures have not been properly composted. Besides, decontamination of food by means such as irradiation and synthetic disinfectant is prohibited in organic production that fresh organic produce may carry a higher microbial load.

受微生物污染

此外，有人認為，有機食物生產方法較容易出現微生物污染。有機農業使用經過堆肥化處理的糞肥作為肥料。糞肥如未經適當的堆肥化處理，可能令農作物和附近水源受到致病菌污染。此外，有機生產禁止以輻照技術和合成消毒劑等方法為食物進行消毒，因此新鮮的有機農作物可能含有較多微生物。

雖然人們關注到有機食物的安全問題，但目前並無有力的科學證據證明有機食物的安全性不及傳統方式生產的食物。霉菌毒素和致病微生物同樣有機會存在於有機和傳統的生產系統。聯合國糧食及農業組織指出，只要遵從優良務農規範，便可把微生物危害和霉菌毒素污染的風險減至最低。有機和傳統農業方法均可生產出可供人類安全食用的食物。

總括而言，有機食物與傳統食物的安全性和營養價值並無顯著差別，其主要分別在於不同的生產、加工和處理方法。

Despite concerns over the safety of organic food, there is currently no scientifically tenable evidence that organic food is less safe than food produced by conventional means. Mycotoxins and pathogenic microorganisms may be present in both organic and conventional production systems. According to the Food and Agriculture Organization (FAO), microbial hazards and risks of mycotoxin contamination can be minimised if Good Agriculture Practice (GAP) has been followed. Both organic and conventional farming systems have the potential to produce food that is safe for human consumption.

Above all, organic food and conventional food are comparable in terms of safety and nutritional value. The major differences between these two food types are their growing, processing and handling methods.

食物事故點滴
Food Incident Highlight

與即棄餐盤墊紙有關的健康問題

最近，某政黨進行的一項調查引起市民關注連鎖快餐店的食物(如薯條)與即棄餐盤墊紙直接接觸可能對健康造成的影響。

一般而言，即棄餐盤墊紙用於展示和宣傳用途，而有關的健康關注主要是當即棄餐盤墊紙與食物接觸時，墊紙上的印墨會否釋出化學物。外國研究顯示，從廣泛用於食物包裝的印墨釋出至食物的化學物分量，對人體健康構成的風險不大。

然而，即棄餐盤墊紙通常並非以專供盛載食物的食物接觸物料製成。食物不應直接放在餐盤墊紙上，以盡量減低對健康造成的風險。此外，中心建議業界在餐盤墊紙上加印警告字句提醒顧客。

Health Issue of Disposable Tray Liner

Recently, a survey conducted by a political party raised concerns over the potential health risk of direct contact between foods, such as French fries, and disposable tray liners used in fast food chains.

Generally speaking, disposable tray liners are for presentation and advertising purposes. The health concern is mainly on whether any chemicals in printing ink will be released from the liners when in contact with foods. According to overseas research, the amounts of chemicals released from widely used printing ink for food packaging to foods will not pose a significant risk to human health.

Nonetheless, disposable tray liners are usually not made from food contact materials intended to hold foods. It is advised that foods should not be placed directly on these tray liners to minimise any health risks. Also, a warning is suggested to be printed on the tray liners as a friendly reminder.

食物智庫
Food for Thought

大閘蟹

由今期開始，我們推出全新欄目“食物智庫”，目的是提高大眾在食物安全方面的一般知識(即找出食物危害並作出處理)，從而懂得精明選購和安全處理食物。首先，我們會談一談現時到處有售的中式時令食品——大閘蟹。

Hairy Crab

Starting from this issue, we introduce this new “Food for Thought” column with a purpose to better our general knowledge in food safety (i.e. identify food hazards and tackle them), so that we can choose our food wisely and handle our food safely. Let's begin with the hairy crab, a seasonal Chinese delicacy, which is now widely available.

大閘蟹的食物安全/健康問題 Food Safety/Health Concerns in Hairy Crab	給市民的建議 Advice to the Public
寄生蟲感染(例如衛氏並殖吸蟲)和細菌性腐壞 Infestation of parasite (such as <i>Paragonimus westermani</i>) and bacterial spoilage	<ul style="list-style-type: none"> 選購沒有異味、外殼完整和有光澤的活大閘蟹 Buy live hairy crabs with intact, shiny shells without a foul smell. 烹煮前，用刷子及清水洗擦蟹身、爪和鉗 Brush and wash the shells and claws with water before cooking. 徹底煮熟後才可進食 Cook thoroughly before consumption.
濫用獸藥(例如抗生素)及人造激素以促進大閘蟹生長 Abuse of veterinary drugs (such as antibiotics) and synthetic hormones used in crabs to promote growth	<ul style="list-style-type: none"> 到可靠的店舖或食肆選購大閘蟹 Buy hairy crabs from reliable shops or restaurants.
在受污染水域養殖的大閘蟹體內會有污染物(例如重金屬) Pollutants (such as heavy metals) for crabs cultivated in contaminated water	<ul style="list-style-type: none"> 保持均衡飲食 Maintain a balanced diet.
膳食膽固醇 Dietary cholesterol	<ul style="list-style-type: none"> 有節制地進食大閘蟹 Eat hairy crabs in moderation.

風險傳達
工作一覽
Summary of
Risk Communication Work

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