食物安全焦點
Food Safety Focus

食物安全中心
Centre for Food Safety

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鄧紹平博士及林漢基博士聯合報告

Reported by Dr. Anna TANG and Dr. John LUM, Scientific Officers, Risk Communication Section, Centre for Food Safety

最近，經過長時間冷藏的食物的安全問題引起關注。本文將探討有關冷藏食物的各種安全問題。

冷藏—保存食物的方法

冷藏是延長生肉或熟食食用期限的常見方法。冷藏溫度(攝氏-18度或以下)能抑制微生物(如細菌、酵母、霉菌等，包括病原體)生長，否則食物可能會變壞或出現安全問題。因此，把食物一直保持在冷藏溫度可在較長一段時間內保證其食用安全。美國農業部指冷藏食物只要貯存得當，可以永久保存，不會影響其食用安全。雖然冷藏可保持食物的食用安全，但食物經過長時間冷藏，品質有機會大打折扣。肉類經過冷藏，肉質或會起變化，脂肪可以被分解，色澤也可能會轉變，原因是動植物天然存在一些令食物成分分解或氧化的酵素，冷藏只能減緩但不能完全抑制這些酵素的活動。

在冰格放置溫度計，以確保冷藏食物貯存於攝氏-18度或以下。
Ensure that frozen food is kept at -18°C or below by checking the temperature with a thermometer placed inside the freezer.

冰格食物的保質期

雖然冷藏能長期保持食物安全，但食物業界一般並不會選擇為冷藏食物標示無限的的保質期。在決定保質期限時，食物的品質是一個重要的考慮因素。冷藏食物的保質期限(通常以月或年計)一般是作為品質指標之用。此外，如冰格的溫度長期或有時高於攝氏-18度，食物的保質期或會縮短。

正確解凍以保食物安全

冷藏食物應用正確方法解凍，以保食物安全。冷藏雖然能抑制微生物的繁殖速度，卻不一定會殺死微生物。食物在解凍的過程中，微生物可以再次活躍起來。因此，食物不宜在室溫下解凍，因為此舉需時較長，會讓包括病原體在內的微生物有機會在食物完全解凍前生長。這樣可能會令冷藏的熟食或即食食物變得不安全，亦

Recently, there have been concerns as to whether frozen foods kept for long durations are safe for consumption. This article looks into various issues of freezing and food safety.

Freezing as a Means of Food Preservation

Freezing is a common way to preserve raw meat or cooked food for later consumption. The freezing temperature (-18°C or below) inhibits the growth of microbes (e.g. bacteria, yeasts and moulds, including pathogens) which may otherwise cause the food to spoil or be unsafe for consumption. As such, food stored at a stably maintained freezing temperature could be kept safe for a prolonged period of time. The US Department of Agriculture opines that food safety of properly stored frozen food could last almost indefinitely! Although freezing keeps the food safe for consumption, the organoleptic quality of the food may deteriorate upon long-term freezing. There may be changes in meat texture, fat can crumble and meat colour may also change because freezing slows down but does not totally stop the actions of certain enzymes naturally present in animals and vegetables which would cause food components to degrade or oxidise.

Freezer Storage Duration

Although freezing can keep food safe for a very long period, the food industry will not label the storage time of frozen food as indefinite. The quality of food also needs to be considered when determining the storage duration. The storage duration for frozen food (usually in terms of months or years) is usually set out as a quality indicator. The duration may be reduced if the freezer temperature cannot reach -18°C or fluctuates to above -18°C.

Proper Thawing to Ensure Food Safety

Frozen food should be thawed properly to ensure food safety. Although the growth of microorganisms is inhibited when frozen, they may not be killed and may become active again when food is thawed. Therefore, food should not be thawed at room temperature because the process will take a long time and microorganisms, including pathogens, can multiply before the food is entirely defrosted. This may render frozen cooked food or frozen ready-to-eat food unsafe and increase the risk of cross-contamination by frozen raw food. Frozen food should be thawed in a refrigerator (0°C - 4°C),

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可能會增加被生的冷藏食物交叉污染的風險。冷藏食物應放進雪櫃解凍(攝氏零度至4度)；或用流動的冷水解凍；亦可用微波爐解凍。用流動的冷水或用微波爐解凍的食物在解凍後應立即烹煮。解凍後的食物一般不宜再次冷藏，除非整件食物的溫度在解凍後仍然保持在攝氏4度以下。食物解凍後就會變得易壞，必須盡快烹製和進食。

冷鏈的最佳管理方法

對食物商而言，冷鏈(包括收貨、加工、貯存、運輸、分銷及零售)的溫度控制對保證冷藏食物的安全和品質極其重要。冷鏈的各個環節必須全程進行溫度監控，以確保食物一直貯存於冷藏溫度，只可在容許的範圍內有偏差而不會影響安全和品質。食品法典委員會的《速凍食品加工和處理操作規範》(CAC/RCP 8-1976) 為冷藏食物的加工和處理提供指導原則，以保障冷藏食物安全。此外，業界還須遵守良好的衞生和製造規範，並在冷鏈各環節建立“食物安全重點控制”(HACCP)系統。

根據《進出口條例》(第60章)的規定，凡進口肉類和禽肉(包括冷藏產品)，均須領有進口許可證。《公眾衞生及市政條例》(第132章)之《進口野味、肉類及家禽規例》規定，所有進口的肉類和禽肉必須附有衞生證書。此外，進口商須遵守《食物安全條例》(第612章)中有關備存食物進出紀錄的規定。

注意要點：

- 冷藏食物如以正確方式處理並一直貯存於攝氏-18度或以下，可長期安全保存。
- 冷藏食物存放的時間越久，品質有機會越差，因為食物一直在以緩慢的速度變質。
- 食物不宜在室溫下解凍，因為此舉需時較長，會讓包括病原體在內的微生物有機會在食物完全解凍前生長。

給業界的建議

1. 為保持冷藏食物的安全和品質，控制好冷鏈各環節的溫度。
2. 把以供出售的冷藏食物放在攝氏-18度或以下的冷藏櫃內。
3. 售賣或配製食物時應採用先入先出的原則。

給消費者的建議

1. 應選購存放在冷藏櫃裏的冷藏食物。
2. 用溫度計監測雪櫃冰格的溫度，以確保冷藏食物貯存於攝氏-18度或以下。
3. 冷藏食物應放進雪櫃解凍(攝氏零度至4度)；如要快速解凍，可用流動的冷水或用微波爐解凍，但食物在解凍後須立即烹製。

under cold running water, or in a microwave oven. Frozen food thawed under cold running water or in a microwave oven has to be cooked immediately after thawing. Refreezing of thawed food is generally not recommended, unless the warmest temperature of the thawed food is still kept below 4°C. Once thawed, the food becomes perishable again and should be prepared as intended and consumed as soon as possible.

Best Practices in the Cold Chain

For traders, good temperature control is essential along the cold chain (include receiving, processing, storage, transport, distribution and retailing) for maintaining the safety and quality of frozen food. Temperature should be monitored along the cold chain in order to ensure that a freezing temperature is maintained, within permitted tolerances which do not affect safety and quality. The Codex Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976) provides guidance on the processing and handling of frozen food to help ensure product safety. The trade is also reminded to observe good hygienic and good manufacturing practices and to develop a Hazard Analysis and Critical Control Point (HACCP) programme for each operation in the cold chain.

The import of meat and poultry (including frozen products) requires an import licence under the Import and Export Ordinance (Cap. 60). Trade members are reminded to ensure that there are relevant health certificates for all meat and poultry imported under the Imported Game, Meat and Poultry Regulations of the Public Health and Municipal Services Ordinance (Cap. 132) and that the record keeping requirement is met under the Food Safety Ordinance (Cap. 612).

Key Points to Note:

- Frozen food can be kept safe for extended periods if handled properly and stored constantly at -18°C or below.
- The quality of frozen food may diminish with increasing storage time as deterioration continues to take place at a slow rate.
- Frozen food should not be thawed at room temperature because the process will take a long time and pathogens can multiply before the food is entirely defrosted.

Advice to the Trade

1. Ensure good temperature control along the cold chain to maintain the safety and quality of frozen food.
2. Display frozen food for sale inside freezer cabinets with proper temperature control at -18°C or below.
3. Follow first-in-first-out rule for sale and for food preparation.

Advice to Consumers

1. Purchase frozen food offered for sale in freezer cabinets.
2. Use thermometers to monitor the temperature of the home freezer compartment to ensure that frozen food is kept at -18°C or below.
3. Thaw frozen food in a refrigerator (0° - 4°C). For faster thawing, food can be thawed under cold running water or in a microwave oven, but the food has to be cooked immediately after thawing.

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

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食物安全平台
Food Safety Platform

味精：使用它還是厭惡它？（下篇）
Monosodium Glutamate (MSG): Use it or Loathe it? (Part II)

食物安全中心
風險評估組
科學主任陳家茵女士報告

Reported by Ms. Michelle CHAN, Scientific Officer,
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上期我們介紹了穀氨酸一鈉（俗稱味精）的特性、用途和食物安全問題。這期我們會探討味精在攝取鈉方面的角色和味精的標籤事宜。

使用味精作為減少用鹽的方法之一

鹽(氯化鈉)對於烹飪有許多用處，包括令食物變得更加美味。但鹽是我們從飲食中攝取鈉的主要來源，而身體攝入過量的鈉會增加患上高血壓、中風和心血管疾病的風險，所以我們必須控制添加在食物中的鹽分。一下子完全不放鹽會令食物變得不太吸引，要減少攝取鈉，還得靠逐漸調整食物的鹹味。除了逐漸減少食物中的鹽分外，其他可行的方法包括改變鹽粒的大小，用鹽的替代品及其他味道的配料取代鹽。除了香草和香料外，味精是其中一種用作取代食物中部分鹽的增味劑。

鹽與味精

眾所周知，鹽和味精這兩種化合物都含有鈉。鈉在鹽的成分中約佔39%，而在味精的成分中約佔12%，換言之，味精的鈉含量是鹽的三分之一。

味精這種增味劑能帶給食物鮮味和鹹味。在配製食物時加入味精，據稱能減少菜式的鈉含量20%到40%。有研究指用味精取代湯中部分的鹽，既可減少整體的鈉含量，又能保持食物美味可口。這些研究顯示，在食物中加入的味精分量比減去的鹽分量少。

然而，味精和鹽及其他含鈉的調味料一樣，是我們從飲食中攝取鈉的來源之一。小量的味精能增加部分食物的鮮味(例如一公斤肉放不多於一茶匙味精；四至六份蔬菜放不多於半茶匙味精)，但放得過多反而收效甚微甚至起不到作用。無論是從健康或應用的角度而言，如用味精作調味，應放能達到增味效果所需的最低分量。

味精的標示

消費者在選購預先包裝食物時可以先閱讀食物標籤才作出選擇。根據本港規例，預先包裝食物如添加了味精，便須在標籤的配料表上標示其名稱(穀氨酸一鈉)或國際編碼(621或E621)及作用類別(增味劑)。

水解蛋白、自溶酵母和酵母萃取物等食物配料天然含有穀氨酸和包括味精在內的穀氨酸鹽。如你在配料表中看到這些名稱，即表示食物含有穀氨酸成分的配料。

味精的各種標示方式
Different labelling formats of monosodium glutamate

In the last issue, we discussed the nature, uses and food safety of monosodium glutamate (MSG). In this issue, let us look into the role of MSG in sodium intake and labelling issues of MSG.

Use MSG as One of the Possible Ways to Reduce the Need for Salt

From a culinary perspective, salt (sodium chloride) has its desirable properties including enhancing the positive sensory attributes of food. However, as a major sodium contributor in diet, the amount of salt added to food should be controlled because excessive sodium intake is associated with increased risk of hypertension, stroke and cardiovascular diseases. While abrupt absence of salt in food can make food less appealing, reduction of dietary sodium intake relies on modification of the salt taste. Besides gradual reduction of salt in food, other possible strategies include, but are not limited to, modification of size of salt particles, use of salt substitutes and replacement of salt with ingredients having other flavours. In addition to herbs and spices, MSG is another example of flavour enhancer to replace some of the salt in food.

Salt Versus MSG

You may be aware that both salt and MSG are sodium-containing compounds. Comparing to salt, MSG contains one-third the amount of sodium as its counterpart. Whilst salt contains about 39 per cent sodium, MSG contains about 12 per cent sodium.

As a flavour enhancer, MSG imparts "umami" taste as well as a salt taste to food. When used in combination with a small amount of salt during food preparation, MSG has been reported to reduce the total amount of sodium in a recipe by 20 to 40 per cent. Studies have shown that it is possible to maintain food palatability with a lowered overall sodium level when MSG is substituted for some of the salt in soups. In those cases, the amount of MSG added to food is less than the quantity of salt being removed from it.

Nevertheless, same as salt and other sodium containing seasonings, MSG is a source of sodium in our diet. While small amounts of MSG can be used as flavour enhancer in some kinds of food, for example, not more than one teaspoon of MSG per kilogram of meat or half teaspoon per four to six servings of vegetables, adding more contributes little or no improvement in taste. All in all, from both health and technological points of view, if MSG is added to food, a minimum amount of MSG should be used to serve its flavour-enhancing properties.

Labelling of MSG

Consumers can make informed choices by reading the food labels on prepackaged food. Under local regulation, if MSG is added to prepackaged food, it is required to list out its specific name (i.e. monosodium glutamate) or identification number (i.e. 621 or E621) together with its functional class (flavour enhancer) in the ingredient list on the food label.

Glutamic acid and its salts including MSG can naturally occur in ingredients such as hydrolysed vegetable protein, autolysed yeast, yeast extract, etc. If any of these names show up in the ingredient list, you will know that glutamate-containing ingredients are present in the food.

本港法例規定食物商須確保食物標籤上的資料正確和沒有誤導成分。食物如添加了味精或天然含有味精，便不應聲稱“不含味精”。“不添加味精”的聲稱會令消費者覺得產品不含味精，如產品的配料本身天然含有味精，作出這種聲稱則為不可取。

給業界的建議

1. 改良食品配方，使用較少鹽和含鈉的調味料。
2. 如使用味精以減少鹽的分量，便應按照優良製造規範，使用達到增味效果所需的最低分量。
3. 按照本港的法例規定，在標籤上妥為標示味精等食物添加劑。

給市民的建議

1. 煮食和用膳時少用含鹽／鈉的調味料。
2. 考慮用香草和香料（如辣椒、薑等）及穀氨酸含量豐富的配料（如蕃茄、菇類等）來提升食物的味道。
3. 閱讀食物標籤，作出知情的選擇。

The food trade is required by local regulation to make sure that information on the food label is accurate and not misleading. Food that contains added or naturally occurring MSG should not make "No MSG" claim. As "No added MSG" claim may leave the consumers with the impression that MSG is not present in the food, such a claim is undesirable for food with ingredients that naturally contain MSG.

Advice to the Trade

1. Reformulate products with less salt and sodium-containing seasonings.
2. On occasion that MSG is added to replace some salt in food, use it in accordance with Good Manufacturing Practice to limit the quantity to the lowest level for achieving flavour-enhancing effect.
3. Observe the regulatory requirement under the local legislation on labelling of food additives including MSG.

Advice to the Public

1. Reduce the amount of salt/sodium-containing seasonings added to food when cooking and at the table.
2. Consider using herbs and spices (e.g. chili, ginger) and glutamate-rich ingredients (e.g. tomato, mushroom) to enhance the flavour of food.
3. Read the food label to make informed choices.

食物事故點滴
Food Incident Highlight

“古怪”水果有問題嗎？

食物安全中心(中心)不時接到市民的查詢，問食用空心西瓜、果核裂開的桃和裂皮荔枝這些“古怪”水果是否安全。其實，水果長得奇怪大多是生長環境，例如不適當的水分、陽光、溫度、營養等造成的。雖然對一些人來說，這些水果外觀奇怪，但食用上是安全的。

另一方面，壞了的水果通常很容易分辨，例如氣味或味道有異，再加上皮上有瘀傷和損傷；有些位置發霉和黏手；植物組織或果肉有損及／或有水漬斑。雖然不是所有腐爛的水果都含致病微生物或毒素，但腐爛的水果營養價值及味道或多或少已受損，不適宜再吃，應該及早棄掉。

中心提醒業界和市民要管理好貯存的食物，讓水果在食用前保持新鮮。

Anything Wrong with “Weird-looking” Fruits?

From time to time, the Centre for Food Safety (CFS) receives enquiries regarding whether certain "weird-looking" fruits such as melon with "hollow-heart", peach with split stone, lychee with crack shell, etc. are safe to eat. In fact, many of these are physiological changes or disorders of fruits which may be caused by growing conditions such as inappropriate levels of water, light, temperature and nutrients. They may look strange to some but are safe to eat.

On the other hand, rotten fruits usually have obvious signs such as unpleasant odour or taste along with bruises and blemishes, mould and slimy patches, breakdown of plant tissue or flesh and/or water-soaked lesions. Although not all rotten fruits contain pathogenic organisms or toxins, they are undesirable for consumption as there are varying degrees of deterioration in nutritional values and organoleptic properties. It is advisable to discard rotten fruits.

The CFS reminds the trade and the public to adopt good stock management to keep fruits fresh before consumption.

壽司和刺身的微生物質素

食物安全中心(中心)上月公布壽司和刺身的微生物質素報告。報告指全部197個樣本均沒有食物安全問題，但有四個樣本的衞生指標測試結果未如人意。

米飯經適度加酸至酸鹼值4.6或以下，已知可抑制致病細菌（尤其是蠟樣芽孢桿菌）滋生。除了兩個樣本外，其餘壽司樣本的米飯酸鹼值均在4.6或以下。

中心指出，免疫力較低的人、長者、孕婦及幼童患食源性疾病的風險較高，不應進食以生或未經徹底煮熟的配料製成的刺身或壽司。中心亦呼籲業界遵守《食物微生物含量指引》，把壽司和刺身存放在攝氏4度或以下；如壽司在攝氏4度以上的環境中陳列超過四小時，即須予以丟棄。此外，食物處理人員亦應檢測並確保壽司飯的酸鹼值在4.6或以下。

一些測量壽司飯酸鹼度的工具
Some tools for measuring pH of sushi rice

Microbiological Quality of Sushi and Sashimi

Last month, the Centre for Food Safety (CFS) released the report on the microbiological quality of sushi and sashimi. Whilst none of the 197 samples had any food safety problems, four were found unsatisfactory regarding the hygienic indicators.

Proper acidification of cooked rice to pH 4.6 or below is known to inhibit the growth of pathogenic bacteria, particularly *Bacillus cereus*. The sushi rice of all but two samples was at pH 4.6 or below.

The CFS advises people with weakened immunity, the elderly, pregnant women and young children who are at higher risk for foodborne illnesses to avoid eating sashimi or sushi with raw or undercooked ingredients. The CFS also urges the trade to observe the Microbiological Guidelines for Food and to keep sushi and sashimi at 4°C or below, and to discard the sushi displayed at above 4°C for over four hours. Food handlers are advised to check the pH value of acidified rice with the aim to achieve a pH value of 4.6 or below.