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野生菇類—種類繁多，毒素多樣

Wild Mushrooms - Numerous Species and Numerous Toxins

食物安全中心風險評估組
科學主任林漢基博士報告

Reported by Dr. John LUM, Scientific Officer,
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菇類是人們常吃的食物，含有各種必需營養素，且味道與香氣獨特。然而，進食野生菇類後中毒的事件偶有發生。那麼，何謂菇類中毒？成因為何？

何謂菇類中毒？

菇類中毒是因進食了含有有害毒素的生或煮熟真菌所致。這些毒素由真菌自然產生，烹煮、製罐或冷藏都不能將之消滅。菇類中毒個案主要是由於進食了誤以為是可食用的有毒野菇，或所進食的可食用菇類摻雜了有毒品種。

菇類中毒的特徵

菇類中毒一般是急性的。不過，某些菇類毒素(例如臭名昭著的毒傘肽)的徵狀會延遲發作，在進食後很久才會出現。待徵狀出現時，肝臟或腎臟或已嚴重受損，有機會危及生命。

菇類毒素的種類

菇類毒素一般可分為以下四類：

- 類雙硫命毒素：這類毒素一般不會引發任何徵狀，除非進食毒菇後飲酒。菇類會產生毒素，其代謝物可抑制肝臟分解酒精的能力，飲酒便會引致劇烈頭痛、潮紅、噁心和嘔吐。多種墨汁鬼傘菇類含有這類毒素。
- 腸胃毒素：這類毒素會引致短暫腸胃不適，包括嘔吐、腹痛和腹瀉。雖然這類毒素的確實化學屬性仍大致不明，但有關菇類所含的糖、氨基酸或肽類可能與之有關。其中一個典型例子是綠褶菇，進食後會引致腸胃不適。

Mushrooms are commonly consumed as food with various essential nutrients and provide a distinctive taste and aroma. However, there are reports of poisoning after eating wild mushrooms from time to time. So, what is mushroom poisoning and what causes it?

What is Mushroom Poisoning?

Mushroom poisoning results from consuming raw or cooked fungi that contain harmful toxins. These toxins are naturally produced by the fungi and cannot be destroyed by cooking, canning or freezing. Mushroom poisoning cases are mainly resulted from consuming toxic wild mushrooms that have been misidentified as edible, or edible mushrooms that have been mixed with toxic species.

Characteristics of Mushroom Poisoning

Mushroom poisoning is typically acute. However, symptoms of certain mushroom toxins, such as the notorious amatoxins, exhibit a delayed onset and occur long after the consumption. By the time symptoms appear, severe liver or kidney damage may have already occurred, which can be fatal.

Types of Mushroom Toxins

Mushroom toxins may be grouped into one of the four categories outlined below:

- Disulfiram-like toxins: These toxins generally cause no symptoms, unless alcohol is consumed after eating the mushroom. The mushroom produces a toxin, and its metabolite can block the liver's ability to break down alcohol. Drinking alcohol will lead to intense headaches, flushing, nausea and vomiting. Various Ink Cap mushrooms contained disulfiram-like toxins.
- Gastrointestinal toxins: These toxins cause temporary digestive distress, including vomiting, abdominal cramps and diarrhoea. While the exact chemical identity of these toxins remains largely unknown, sugars, amino acids or peptides present in the mushroom might be involved. A classic example is the Green-gilled mushroom which causes gastrointestinal upset upon consumption.
- Neurotoxins: These toxins affect the nervous system, causing profuse sweating, convulsions, hallucinations, and abdominal

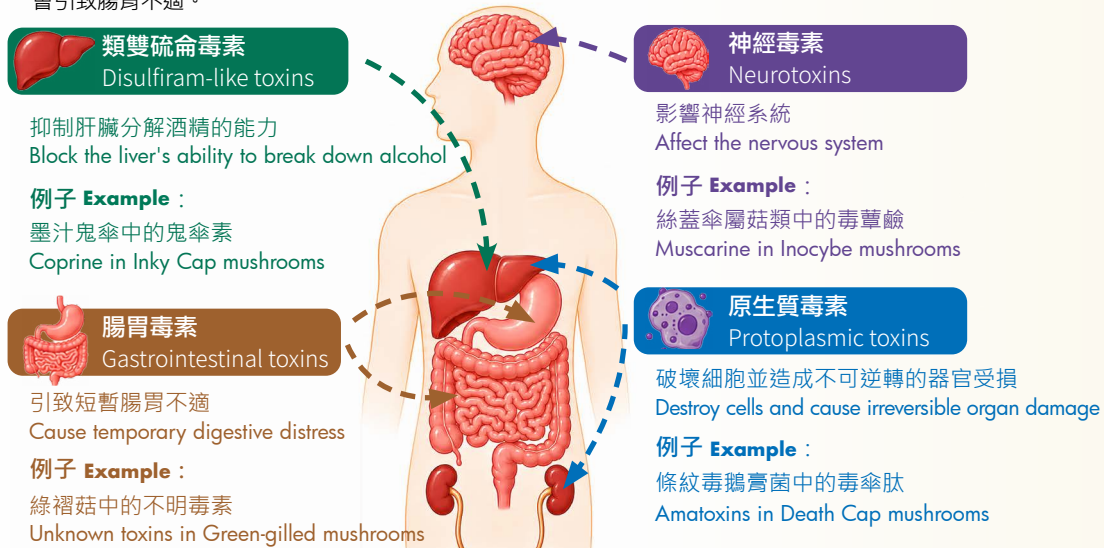


圖1：不同菇類毒素對人體的影響

Figure 1: Effects of different mushroom toxins on human body

- 神經毒素：這類毒素影響神經系統，引致大量出汗、抽搐、出現幻覺和腹痛。神經毒素的例子包括毒蕈鹼，絲蓋傘屬和杯傘屬菇類含高量的毒蕈鹼毒素。
- 原生質毒素：這類毒素可損害人體細胞，並造成不可逆轉的器官受損。原生質毒素的例子包括毒傘肽和胛，可在條紋毒鵝膏菌和致命鵝膏菌找到。

菇類中毒的徵狀和嚴重程度視乎攝入毒素的種類和分量而定。據報，進食一朵條紋毒鵝膏菌便足以致命。此外，整朵毒菇均可含有毒素，不吃某特定部分並無法避免中毒。

菇類的安全管理

可食用與有毒的菇類外形往往十分相似，極難分辨。因此，市民不應自行採摘野菇食用。即使可食用的乾燥菇類本身不含毒素，但如處理不當，也會導致細菌滋長。在室溫浸泡菇類的時間不宜過長（一般不超過兩小時），否則應該放入雪櫃浸泡。

食物安全中心對本港出售的食物（包括菇類）實行以風險為本的監測方案，在2023年1月至2026年6月間抽取了超過150個菇類樣本進行菇類毒素檢測，所有樣本的檢測結果均令人滿意。

注意事項

- 菇類毒素無法透過烹煮、製罐或冷藏消滅。
- 中毒個案主要是由於進食了誤以為是可食用的有毒野菇，或所進食的菇類摻雜了有毒品種。
- 菇類中毒的嚴重個案可致命。

給消費者的建議

- 由於食用菇和有毒品種的菇類難以分辨，切勿自行採摘野菇進食。
- 向信譽良好和可靠的零售商購買菇類，避免購買懷疑混雜了不明品種的菇類。
- 外遊人士應保持警覺，只向可靠的商戶購買菇類。
- 不要購買看起來不衛生或有變壞迹象的菇類。
- 把菇類徹底清洗和煮熟才可進食。
- 如需隔夜泡發菇類，應把菇類放入雪櫃。
- 如懷疑進食菇類引致中毒，須立即求醫。

給業界的建議

- 確保所出售的菇類（不論新鮮與否）適宜供人食用。
- 妥善保存交易記錄，以便在有需要時追溯源頭。
- 從信譽良好和可靠的供應商採購菇類，並防止當中摻雜了品種不明的菇類。

迷思與事實

坊間流傳辨識有毒菇類的方法，諸如外表鮮豔、沒有蟲蛀，或使銀器變黑等，皆不正確。即使以照片辨識程式進行鑑定也不可靠，過往亦曾發生因進食經程式鑑定為可食用的菇類而中毒的個案。

cramps. Examples of neurotoxins include muscarine, which is found at high level in *Inocybe* and *Clitocybe* species.

- Protoplasmic toxins: These toxins can injure body cells and cause irreversible organ damage. Example of protoplasmic toxins include amatoxins and hydrazines, which are found in Death Cap and Destroying Angel.

The symptoms and severity of mushroom poisoning depend on the type and amount of toxins ingested. There are reports that the consumption of a single Death Cap mushroom could be lethal. Moreover, the entire mushroom could contain toxins and poisoning could not be avoided by not eating a specific part of the mushroom.

Managing the Safety of Mushroom

Edible and poisonous mushrooms often look remarkably similar, making differentiation incredibly difficult. As such, individuals should not collect wild mushrooms themselves for consumption. Even those dried edible mushrooms do not contain toxins by itself, bacterial growth will occur if they are not handled properly. The time for soaking mushrooms at room temperature should not be too long, generally no more than two hours, otherwise they should be soaked in the refrigerator.

The Centre for Food Safety has implemented a risk-based surveillance system for food products available in Hong Kong, including mushrooms. Between January 2023 and June 2026, over 150 mushroom samples have been collected for testing of mushroom toxins. The test results of all samples were satisfactory.

Key Points to Note

- Mushroom toxins cannot be destroyed by cooking, canning or freezing.
- Poisoning cases are mainly resulted from consuming toxic wild mushrooms that have been misidentified as edible, or mushrooms that have been adulterated with toxic species.
- Severe cases of mushroom poisoning can be life-threatening.

Advice to Consumers

- Do not pick wild mushrooms for consumption as distinguishing edible mushrooms and poisonous species is difficult.
- Buy mushrooms from reputable and reliable retailers, and avoid mushrooms which are doubted to be mixed with unknown species.
- Travellers should remain vigilant when abroad and only patronise reliable shops when buying mushrooms.
- Do not buy mushrooms which look unhygienic or show signs of spoilage.
- Wash and cook mushrooms thoroughly before consumption.
- Mushrooms should be kept in the refrigerator if overnight soaking is needed.
- Seek medical treatment immediately if mushroom poisoning is suspected.

Advice to Trade

- Ensure mushrooms sold, whether fresh or not, are fit for human consumption.
- Maintain proper trade records to facilitate source tracing when necessary.
- Source mushrooms from reputable and reliable suppliers; and prevent mushrooms from mixing with unknown species.

Myth and Fact

There are many folk traditions on identifying poisonous mushrooms: that they are usually brightly coloured, insect free or they turn the silverware black. These folk traditions are not correct. Even the identifications by using photo-recognition programmes are not reliable and there have been poisoning cases after eating mushroom that the programme identified as edible.

本港的「1+7」營養資料標籤制度：食品法典委員會準則解讀

Hong Kong's "1+7" Nutrition Labelling Scheme: Decoding Codex Principles

食物安全中心風險評估組
科學主任林伏波博士報告

Reported by Dr. Violette LIN, Scientific Officer
Risk Assessment Section, Centre for Food Safety

營養資料標籤制度（營養標籤制度）乃根據《食物及藥物（成分組合及標籤）規例》（第132W章）強制實施，是減輕高血壓等本地非傳染病的重要公共衛生工具。由於香港十分倚賴進口食物，營養標籤制度與國際慣例（特別是食品法典委員會有關營養標籤和聲稱的指引）緊密接軌。本文闡述自2010年7月1日起實施的預先包裝食物強制營養標籤制度如何與食品法典委員會的最新修訂保持一致。營養標籤制度

Mandated under the Food and Drugs (Composition and Labelling) Regulations (Cap. 132W), the [Nutrition Labelling Scheme](#) (NLS) is a vital public health tool for mitigating local non-communicable diseases like hypertension. Since Hong Kong relies heavily on imported food, the NLS closely aligns with international practices, specifically the Codex Alimentarius Commission (Codex) guidelines on nutrition labelling and claims. This article reveals how the compulsory NLS for prepackaged food, implemented since 1 July 2010, maintains harmony

在保障本地公共衛生與促進國際貿易之間取得平衡，避免為遵守世界貿易組織的規則而造成不必要的技術壁壘。

實施營養標籤制度有三個主要目的：(i) 幫助消費者作出有依據的食物選擇；(ii) 鼓勵食品製造商提供符合營養準則的食品；以及(iii) 規管有誤導或欺詐成分的標籤和聲稱(見圖)。為達到這些目標，營養標籤制度遵循食品法典委員會的準則，在第132W章訂明精確的營養素定義、清晰的營養素表和嚴格的聲稱標準。這些規定透過工作坊、指引、常見問題等方式傳達給業界和公眾，而所有經整理的資料亦載於指定的[營養標籤制度網站](#)。

能量和營養素的規例定義

在營養標籤制度下，「營養素」的定義為存在於食物中並屬特定類別或其成分的任何物質，即蛋白質、碳水化合物、脂肪、膳食纖維、維他命和礦物質。此外，該物質必須符合以下最少一項條件：(i) 提供能量；(ii) 是身體生長、發育及維持身體正常功能所需的；或(iii) 缺少該物質將導致生化或生理的特性變化。這項定義嚴格遵循食品法典委員會的定義，因而排除非營養素物質，例如「抗氧化劑」、「酵素」和「益生菌」。因此，在營養標籤上標示這些非營養素物質或就這些物質作出任何營養聲稱，均屬誤導。

營養標籤制度亦根據第132W章界定能量和若干核心營養素，例如蛋白質、糖、膳食纖維和反式脂肪酸。這些定義與食品法典委員會的基準完全一致。為協助業界製備可靠的營養標籤，政府在[檢測方法技術指引](#)和有關[營養標籤制度常見問題](#)的網頁上提供了明確的化學和結構定義。

「1+7」營養素框架

營養標籤制度允許業界進行直接化學分析或通過計算方法進行間接營養素分析，以確定營養標籤數值。此舉緊貼食品法典委員會的準則，即營養素的標示應採用加權平均值，而有關數值須根據針對所標籤產品的具代表性產品進行分析所得的數據得出。許多司法管轄區(例如澳洲、加拿大、中國內地和新西蘭)均允許使用營養素資料庫作為營養標籤開發工具。然而，為執法和合規目的，最終的營養標籤數值始終須經化驗分析進行驗證。

根據營養標籤制度，營養標籤必須標示能量及七種核心營養素——即蛋白質、可獲得的碳水化合物、總脂肪、飽和脂肪酸、反式脂肪酸、鈉和糖(「1+7」框架)——以及任何涉及聲稱的營養素。這是參照食品法典委員會最初的「1+3」框架(能量加蛋白質、可獲得的碳水化合物和總脂肪)制定的。其後，食品法典委員會把「1+3」框架擴展為「1+6」，加入飽和脂肪酸、鈉和糖。香港於2010年特別加入反式脂肪酸，以滿足本地健康需求，而營養標籤制度一直行之有效地向消費者提供資訊，並推動業界改良食品配方。這項政策完全符合食品法典委員會的準則，並直接配合世界衛生組織旨在消除[工業生產反式脂肪酸](#)的全球行動。

營養素聲稱和合規準則

營養標籤制度嚴格遵循食品法典委員會的標準規管營養素含量、比較和功能聲稱。「低」或「不含」的聲稱準則(能量、脂肪、飽和脂肪酸、膽固醇和鈉)以及「來源」和「高」的聲稱準則(蛋白質、膳食纖維、維他命和礦物質(鈉除外))在兩個框架下完全相同，豁免原則亦一樣。舉例來說，配料表上諸如「低脂奶」和「低鈉鹽」等字眼不會

with the latest Codex updates. The NLS strikes a balance between protecting local public health while facilitating international trade without creating unnecessary technical barriers under World Trade Organization rules.

The NLS serves three primary purposes: (i) assisting consumers in making informed food choices; (ii) encouraging food manufacturers to apply sound nutrition principles in food formulation; and (iii) regulating misleading or deceptive labels and claims (see Figure). To achieve these goals, the NLS aligns with Codex principles to stipulate precise nutrient definitions, clear nutrient lists, and strict claims standards under Cap. 132W. These requirements are communicated to traders and the public through workshops, guidelines, FAQs, etc., all collated on the designated [NLS website](#).

Regulatory Definitions of Energy and Nutrients

Under the NLS, a “nutrient” is defined as any substance present in food which belongs to, or is a component of, specific categories, namely protein, carbohydrates, fat, dietary fibre, vitamins, and minerals. Furthermore, the substance must satisfy at least one of the following conditions: (i) it provides energy; (ii) it is needed for growth, development, and normal functions of the body; or (iii) its deficit causes characteristic biochemical or physiological changes. This definition adheres strictly to the Codex definition, thereby excluding non-nutrient substances such as “antioxidants”, “enzymes”, and “probiotics”. Consequently, it is misleading to declare these non-nutrient substances on a nutrition label or to make any nutrition claims regarding them.

The NLS also defines energy and certain core nutrients, like protein, sugars, dietary fibre, and trans fatty acids (TFAs) under Cap. 132W. These definitions remain fully aligned with Codex benchmarks. To assist traders in preparing reliable nutrition labels, the Government provides explicit chemical and structural definitions in the [Method Guidance Notes](#) and [FAQs on NLS website](#).

The “1+7” Nutrient Framework

The NLS permits traders to determine nutrition label values through either direct chemical analysis or indirect nutrient analysis based on calculation. This closely follows Codex principles, which state that nutrient declarations should use weighted average values derived from data specifically obtained from analyses of products that are representative of the product being labelled. Many jurisdictions, such as Australia, Canada, the Chinese Mainland, and New Zealand, permit the use of nutrient databases as a nutrition label development tool. However, for enforcement and compliance purposes, definitive nutrition label values will always be verified via laboratory analysis.

Under the NLS, nutrition labels must declare energy plus seven core nutrients—protein, available carbohydrates, total fat, saturated fatty acids (SFAs), TFAs, sodium, and sugars (the “1+7” framework)—and any nutrient subject to a claim. This was initially modelled on the Codex “1+3” framework (energy plus protein, available carbohydrates, and total fat). Codex subsequently expanded “1+3” to “1+6” by incorporating SFAs, sodium, and sugars. Hong Kong specifically added TFAs in 2010 to meet local health requirements, and the NLS has effectively informed consumers and driven industry product reformulation. This policy remains fully aligned with Codex principles and directly supports the World Health Organization’s global campaign to eliminate [industrially produced TFAs](#).

Nutrition Claims and Compliance Criteria

The NLS strictly follows Codex standards for regulating nutrient content, comparative, and function claims. Criteria for “low” or “free” claims (energy, fat, SFAs, cholesterol, and sodium), and “source” and “high” claims (protein, dietary fibre, vitamins, and minerals (except sodium)) are identical across both frameworks. They also share the same principles regarding exemptions; for instance, terms like “low fat milk” and “low sodium salt” inside



圖2：根據《食物及藥物(成分組合及標籤)規例》(第132W章)實施的營養資料標籤制度與食品法典委員會的指引一致，以保障公眾健康和促進貿易

Figure 2: The Nutrition Labelling Scheme, enforced by the Food and Drugs (Composition and Labelling) Regulations (Cap. 132W), harmonises with Codex guidelines to safeguard public health and facilitate trade

被視為營養素聲稱。這項準則適用於整體包裝沒有暗示含有特別營養特質，且所提供資料合乎事實和不具誤導性的情況。

自2010年起生效的營養標籤制度一直與食品法典委員會的最新準則保持一致，讓消費者認識本身的權益並鼓勵業界採用更健康的食物配方。政府會繼續監察國際間的最新規範(包括食品法典委員會的指引)，以保障公眾健康和促進貿易。為確保符合規定，業界人士可瀏覽指定的營養標籤制度網站所載的指引和常見問題，了解有關規定。

an ingredient list are not treated as nutrition claims. This applies provided that the overall packaging does not imply special nutritional properties, and the information provided is factual and not misleading.

The NLS effected since 2010 has remained consistent with the latest Codex principles to empower consumers and encourage healthier food formulation. The Government will continue monitoring international regulatory updates including Codex guidelines to safeguard public health and facilitate trade. To ensure compliance, traders can get familiar with these requirements through browsing the NLS designated website's guidelines and FAQs.

在炎炎夏日把雪糕和冰凍甜點安全帶回家 Bringing Ice-cream and Frozen Confections Home Safely Under the Summer Heat

隨着氣溫上升，妥善處理和運送雪糕和冰凍甜點至為重要。這些食品營養含量高，而且供人直接食用，處理不當可促使細菌迅速滋生。

為確保安全，在購買及運送期間，必須盡量縮短食品暴露在危險溫度範圍(攝氏4度至60度)內的時間：

- 在家居附近購買：向信譽良好且離家不遠的零售商購買，以縮短交通時間；
- 最後選購：在購物行程結束時才拿取冰凍甜點；
- 隔熱保冷：貯存在附有冰墊的保冷袋或旅行冰箱內；
- 立即冷藏：購買後直接回家，抵家後即時存放在冰格內。

保持雪糕冰凍也有助維持品質。雪糕融化會令維持其質感軟滑的氣泡消散，即使重新冷藏，質感也會變硬。如無法一次過吃完，應使用潔淨的器皿分裝雪糕，避免把已融化的雪糕重新冷藏。

As temperatures rise, the proper handling and transport of ice-cream and frozen confections become important. Due to their high nutrient content and that they are consumed as-is, they can facilitate rapid bacterial growth if handled incorrectly.

To ensure safety, exposure to the temperature danger zone (4°C to 60°C) must be minimised during shopping and transportation:

- Shop Near Home: Purchase from reputable retailers close to home to reduce travel time;
- Select Last: Collect frozen confections at the end of the shopping trip;
- Insulate: Store in a chiller bag or ice box with ice packs;
- Store Immediately: Head home directly and store in a freezer upon arrival.

Keeping ice-cream frozen also preserves quality. Melting causes the air bubbles in ice-cream responsible for a soft texture to dissipate, rendering re-frozen products undesirably hard. If cannot finish in one go, portion the ice-cream using clean utensils and avoid re-freezing melted ice-cream.

確保預先切開水果的食物安全 Ensuring Food Safety in Pre-Cut Fruits

預先切開水果是廣受歡迎的消暑佳品，但由於這種食品需經人手製作，而且沒有經過熱處理，因此容易受到李斯特菌、沙門氏菌和志賀毒素大腸桿菌等病原體污染。要確保安全食用，須賴各方共同負責。

食物業經營者必須遵守食物環境衛生署就切開水果所訂定的受限制食物售賣許可證的規定和條件。有關規定主要涵蓋結構和設備標準，例如安裝專用的刀具消毒裝置，以及把產品保持在低溫狀態(攝氏10度以下，最理想為攝氏0度至4度之間)。為協助食物業經營者的日常營運，食物安全中心已發布有關配製預先切開水果的業界指引，重點關注個人清潔、環境衛生和食物安全。

消費者必須保持警惕，只光顧信譽良好的商戶。最理想是把預先切開的水果存放在雪櫃內，並於配製或購買當天食用。貫徹遵行這些安全措施，是安心享用預先切開水果的關鍵。

Pre-cut fruits are a popular summer choice, but manual handling and lack of heat treatment make it vulnerable to pathogens like *Listeria monocytogenes*, *Salmonella* spp. and Shiga toxin-producing *Escherichia coli*. Ensuring safety requires shared responsibility.

Food business operators (FBOs) must comply with the requirements and conditions of the restricted permit for cut fruits set by the Food and Environmental Hygiene Department, which focus on structural and equipment standards, such as installing dedicated knife sterilisation apparatuses and keeping products cold (below 10°C, ideally between 0°C and 4°C). To assist FBOs in their daily operations, the Centre for Food Safety has issued [trade guidelines](#) for preparing pre-cut fruits, focusing on personal cleanliness, environmental sanitation, and food safety.

Consumers must remain vigilant, purchasing only from reputable vendors. Ideally, pre-cut fruits should be kept in refrigerators and consumed the same day it is prepared or bought. Consistently practicing these safety measures is key to enjoying pre-cut fruits with confidence.



風險傳達工作一覽 (二零二六年七月)

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