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焦點個案 Incident in Focus

白飯魚中的甲醛

Formaldehyde in Noodlefish

食物安全中心

風險評估組

科學主任馬嘉明女士報告

Reported by Ms. Janny MA, Scientific Officer,

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食物安全中心(中心)最近公布有關白飯魚含有甲醛的情況的專項食品調查結果,發現一個白飯魚樣本含有甲醛這種非准許防腐劑,含量為每公斤1200毫克。本文將會提供有關食物(特別是白飯魚)含有甲醛的安全資訊。

甲醛是什麼?

甲醛是一種無色但刺鼻難聞的氣體,具有高反應性,並易於溶在水中。市面上並無純甲醛出售,而福爾馬林(約含37%甲醛)則是最常見含有甲醛的溶液。甲醛一般用於製造塑膠樹脂的工業上,又可用於肥料、防腐劑、消毒劑、化妝品、除真菌劑及紡織品等不同產品。

甲醛在環境中無處不在,可經由天然或人工途徑產生。甲醛可透過森林火災等多種途徑天然存在於環境中。此外,許多有生命的生物體內都含有少量在新陳代謝過程中產生的甲醛。至於甲醛的人工產生途徑,則包括燃燒(例如車輛廢氣、焚燒木材、發電廠、焚燒廢物)、建築物料和吸煙時產生的煙。

一般人主要透過吸入空氣(尤其是室內空氣)攝入甲醛。此外,人們亦可從化妝品和食物等其他途徑攝入甲醛。即使難以估計人們每天從食物中攝入甲醛的分量,但世界衛生組織(世衛)估計普通成年人每天可能攝入1.5至14毫克甲醛。其他外國報告估計,如甲醛主要來自食物,一名成年人每天最多可能攝入約10.55毫克甲醛。

食物中的甲醛

天然存在

甲醛存在於多種動物和植物體內,屬於正常新陳代謝過程中的產物。甲醛亦可在水果、蔬菜、肉類、海魚及甲殼類動物等食物中天然存在,含量最高可達每公斤300至400毫克。不過,現時並無報告指甲醛天然存在於白飯魚。中心進行的研究認為,白飯魚中的甲醛是由濫用所致。



新鮮白飯魚
Fresh noodlefish

The Centre for Food Safety (CFS) has recently released the results of targeted food surveillance on noodlefish. Results showed that a noodlefish sample was found to contain formaldehyde, a non-permitted preservative, at 1200 mg/kg. This article provides food safety information on formaldehyde in food especially noodlefish.

What is Formaldehyde?

Formaldehyde, also known as methanal, is a colourless gas but with a pungent and irritating smell. It is highly reactive and readily soluble in water. Pure formaldehyde is not commercially available while formalin (about 37% formaldehyde) is the most common formaldehyde-containing solution. Formaldehyde is generally used in industry for the production of plastic resins. It can also be used in a variety of products such as fertilisers, preservatives, disinfectants, cosmetics, fungicides and textiles.

Formaldehyde is ubiquitous in the environment. Its presence is either produced from natural or manmade sources. Formaldehyde occurs naturally in the environment through various processes such as forest fires. It also exists at low levels in many living organisms as a metabolic intermediate. The manmade sources of formaldehyde include combustions (e.g., vehicle emissions, wood burning, power plant and waste incineration), building materials and tobacco smoke.

Inhalation, especially indoor air, is the major exposure route of formaldehyde among the general population. People may also be exposed to formaldehyde from other sources such as cosmetics and food. Even though it is difficult to estimate the daily intake of formaldehyde from food, the World Health Organization (WHO) estimated it may range between 1.5 and 14 mg in average adult. Other overseas report suggested that if the major contribution is from food, an adult may be exposed up to about 10.55 mg formaldehyde per day.

Formaldehyde in Food

Naturally Occurring

Formaldehyde is present in many animal and plant species as a product of their normal metabolism. Formaldehyde can be found naturally in food including fruits, vegetables, meats, marine fish and crustacean, with levels up to 300 to 400 mg/kg. However, there is no report that formaldehyde is naturally present in noodlefish. Study conducted by the CFS suggested that formaldehyde found in noodlefish was a result of abuse.

For more information on naturally occurring formaldehyde, please refer to "Formaldehyde in Food" in the Food Safety Focus (6th Issue, January 2007).

Illegal Use as Food Additive

Formaldehyde is used as a food preservative illegally since it can prolong the shelf-life of a food by protecting against deterioration caused by microorganisms.

焦點個案
Incident in Focus

如欲了解更多有關食物天然含有甲醛的情況，請參閱《食物安全焦點》(二零零七年一月第六期)內“食物中的甲醛”一文。

非法用作食物添加劑

由於甲醛可防止食物出現由微生物引致的腐壞，從而延長食物的保質期，故此有人會非法使用甲醛作為食物防腐劑。

在有關白飯魚中驗出的高水平甲醛(每公斤1200毫克)很可能是在捕獲白飯魚後，在運送或貯存白飯魚期間，有人刻意添加作為防腐劑。

摻有甲醛的白飯魚多會較韌，這是由於甲醛會與白飯魚中的蛋白質產生反應，導致肌肉變硬和味道變差。

甲醛對健康的影響

吃下小量甲醛不會造成急性中毒，但吃下大量甲醛則會令人出現嚴重腹痛、嘔吐、昏迷、腎臟受損甚或死亡。以往有實驗動物因長期從飲用水攝入甲醛而出現胃部問題。

甲醛對人類健康的主要關注是其致癌性。二零零四年，世衛轄下的國際癌症研究機構把甲醛列為“會令人患癌”(第1組)，指出有充分證據證明從工作環境中攝入甲醛可令人患鼻咽癌。不過，世衛根據現有證據認為，透過進食而攝入的甲醛不會致癌。

安全參考值

美國國家環境保護局已把甲醛的長期口服參考劑量訂為每日每公斤體重0.2毫克。有關白飯魚的甲醛含量為每公斤1200毫克，長期進食不能排除會對健康造成影響。

注意要點

- 甲醛可天然存在或非法添加在食物內。
- 長期進食甲醛含量高的白飯魚不能排除會對健康造成不良影響。不過，透過進食而攝入的甲醛不會致癌。
- 在本港，甲醛並非可用於食物中的准許防腐劑。

本港情況

在本港，根據《食物內防腐劑規例》，甲醛並非可用於食物中的准許防腐劑。

中心過去一直監察在白飯魚內非法使用甲醛的情況。二零零七年至零九年，中心一共抽取了46個白飯魚樣本，當中發現18個(39%)曾非法使用甲醛。有關情況在去年已有改善，不合格比率由二零零七年的50%下降至二零零九年的8%。

給公眾的建議

- 光顧可靠的食肆及食品零售商。
- 只選購新鮮的魚類，避免購買有異味的魚類和肉質較韌的白飯魚。
- 甲醛可溶於水，因此應在烹煮前徹底清洗白飯魚。
- 保持均衡飲食，以免因偏食幾類食物而攝入過量化學物。

給業界的建議

- 謹慎查明食物來源，並應只向可靠的供應商採購食物。
- 切勿在食物中添加甲醛。為盡量減少腐壞情況，把白飯魚貯存在低溫環境(最好在冷藏環境)。
- 確保魚類及其製品在貯存、運送和陳列以供出售的整個過程中妥善冷凍和保存。

更多資料

中心編製有關“食物中含甲醛”的《風險簡訊》。

High level of formaldehyde (1200 mg/kg) detected in the concerned noodlefish is likely to be added deliberately as a preservative after the fish was caught, during transportation or storage.

The texture of noodlefish adulterated with formaldehyde is likely to be stiff since formaldehyde would react with the fish protein and result in muscle toughness and reduce its palatability.

Health Effects of Formaldehyde

Ingestion of a small amount of formaldehyde is not likely to cause any acute effect; however, the intake of formaldehyde in a large amount can cause severe abdominal pain, vomiting, coma, renal injury and possible death in humans. Prolonged ingestion of formaldehyde in drinking-water caused stomach irritation in experimental animals.

The cancer-causing property is the main health concern of formaldehyde. In 2004, the International Agency for Research on Cancer of the WHO classified formaldehyde as “carcinogenic to humans” (Group 1), with consideration that there is sufficient evidence indicating formaldehyde causes nasopharyngeal cancer in humans through occupational exposure. However, in view of the available evidence, WHO considered formaldehyde is not cancer-causing upon ingestion.

Safety Reference Value

The U.S. Environmental Protection Agency has established a chronic oral reference dose of 0.2 mg/kg bw/day for formaldehyde. Adverse health effects due to prolonged consumption of the concerned noodlefish with formaldehyde at 1200 mg/kg cannot be ruled out.

Key Points to Note

- The presence of formaldehyde in food either occurs naturally or is added illegally.
- Adverse health effects due to prolonged consumption of noodlefish with high level of formaldehyde cannot be ruled out. However, formaldehyde is not cancer-causing upon ingestion.
- Formaldehyde is not a permitted preservative in food in Hong Kong.

Local Situation

In Hong Kong, under the Preservatives in Food Regulation, formaldehyde is not a permitted preservative in food.

Over the past years, the CFS has been monitoring the illegal use of formaldehyde in noodlefish. In 2007-2009, a total of 46 noodlefish samples were collected, in which 18 (39%) were found to have used formaldehyde illegally. Improvements were shown last year with the unsatisfactory rate declined from 50% in 2007 to 8% in 2009.

Advice to Public

- Patronise reliable food premises and food retailers.
- Choose only fish that are fresh and avoid those with unusual smell and noodlefish that are stiff.
- Wash noodlefish thoroughly before cooking as formaldehyde is water-soluble.
- Take a balanced diet so as to avoid excessive intake of food chemicals from a small range of food items.

Advice to Trade

- Carefully check the origins of food products, and only obtain them from reliable sources.
- Do not add formaldehyde in food. Store noodlefish at low temperatures, preferably at frozen condition, to minimise spoilage.
- Maintain a proper cold chain to ensure that fish and fish products are kept safely throughout processes including storage, transportation and display for sale.

Further information

The CFS Risk in Brief on “Formaldehyde in Food”.



輻照食物的安全性與標籤事宜

Safety and Labelling of Irradiated Food

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,
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如上一期所述，輻照技術已證實是能夠預防公眾感染食源性疾病的有效安全措施。不過，輻照食物的安全性仍然備受關注。

輻照食物的安全性

有關食物輻照技術的研究早於二十世紀已開始。多個國家規管機構和國際公共衛生組織，包括世界衛生組織(世衛)、聯合國糧食及農業組織(聯合國糧農組織)、國際原子能機構和美國食物及藥物管理局，曾評估輻照食物的安全性，認為按照“優良製造規範”處理的輻照食物可供人安全食用。

輻射安全

在輻照過程中，食物在輸送帶上按設定速度通過輻照區，藉以控制食物吸收的能量。輻照食物絕對不會接觸輻射源中的放射性物質，因此不會受任何放射性物質所污染。為進一步防止感生放射性出現，食品法典委員會和多個國家食物安全機構已設定食物輻照技術的能量上限，以確保輻照食物可供人安全食用。

毒理學安全

專家已通過動物餵飼試驗和人體試驗對輻照食物的潛在毒性進行廣泛研究。世衛、聯合國糧農組織及國際原子能機構的聯合委員會所得數據和各國專家小組獨立進行的其他評估，均顯示食用輻照食物不會產生毒性影響。

此外，專家亦就輻照食物的毒性進行化學評估，結果顯示電離輻射處理技術會令食物出現化學變化，但這些變化在性質和程度上與其他傳統食物加工技術引致的變化相若。現時並無證據顯示輻照技術令食物產生的化學變化會對人類健康構成風險。

營養價值

食物加工通常會令部分營養素流失，以輻照方法處理的食物也不例外。輻照令食物產生的營養成分變化，與烹煮和裝罐等加熱處理方式類似。常量營養素(蛋白質、脂質和碳水化合物)和礦物質不會因輻照而出現重大變化。不過，某些維他命(例如維他命A、B1和E)則對輻照較敏感。一般而言，輻照食物所保存的營養素與經其他防腐技術處理的食物大致相若。由於輻照食物通常只佔日常飲食的一部分，所以食用輻照食物對身體的營養狀況影響不大。

輻照食物的標籤事宜

由於人們一般難以從外觀上分辨輻照食物和沒有經輻照處理的食物，因此輻照食物必須附有標籤，以確保消費者能作出知情的選擇。許多國家已根據食品法典委員會的標準自行制訂輻照食物標籤規例。在加拿大及美國等國家，在市場上出售的輻照食物必須附有國際食品輻照標誌和有關產品經輻照處理的字句。至於香港方面，貯存經輻照食物的容器均須清晰用英文大楷列明“IRRADIATED”或“TREATED WITH IONIZING RADIATION”和用中文列明“輻照食品”。



國際食品輻照標誌
International food irradiation symbol

為監察輻照食物標籤是否符合規定，中心進行定期檢查，以確定經電離輻射處理的食物是否已加上適當標籤。二零零一至零八年，中心並無發現違規個案。

如欲了解更多有關輻照食物的安全性和標籤事宜，讀者可參考中心有關“輻照食物的安全性”的文獻研究。

As discussed in the previous issue, irradiation has been proven as an effective food safety measure to protect public health from foodborne infections. Yet, safety of irradiated food continues to attract public concerns.

Safety of Irradiated Food

Research on food irradiation began as early as 1900's. A number of national regulatory authorities and international public health agencies have evaluated the safety of irradiated foods. These include the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the International Atomic Energy Agency (IAEA), and, the U.S. Food and Drug Administration (FDA). These organisations have found that irradiated food treated according to Good Manufacturing Practices (GMPs) is safe for human consumption.

Radiological Safety

Irradiation process involves passing the food through a radiation field on a conveyor belt at a set speed to control the amount of energy absorbed by the food. The food itself will never come into contact with the radioactive materials of the radiation source, therefore the irradiated food is unlikely to be contaminated with any radioactive substances. To further prevent the occurrence of induced radioactivity, Codex Alimentarius Commission (Codex) and a number of national food safety authorities have set out maximum energy limits for food irradiation to ensure the food is safe for human consumption.

Toxicological Safety

The potential toxicity of irradiated food has been extensively studied through animal and human feeding trials. Data from joint committees of WHO, FAO and IAEA, and other evaluations conducted independently by national expert groups have demonstrated no toxic effects as a result of the consumption of irradiated food.

Toxicity of irradiated food has also been evaluated chemically. It has been shown that treatment with ionizing radiation leads to chemical changes in the resulted food products. These changes, however, are similar in nature and extent to those caused by other conventional processing technologies. There is no evidence that any of the chemical changes caused by food irradiation pose a risk to human health.

Nutritional Quality

Food processing often results in some loss of nutrients and food irradiation is no exception. Nutritional changes in food attributable to irradiation are similar to those result from some heating processes such as cooking and canning. Macronutrients (protein, lipid and carbohydrate) and minerals are not significantly altered by irradiation. However, certain vitamins (e.g. vitamins A, B1 and E) are relatively sensitive to the treatment. In general, the nutrient retention in irradiated food is comparable to that retained in food treated with other preservation techniques. Since irradiated food is normally consumed as part of a mixed diet, consumption of irradiated food will not have a significant adverse effect on our nutritional status.

Labelling of Irradiated Food

Since irradiated food could not generally be distinguished from the untreated counterparts by physical appearance, labelling is essential to ensure consumers' right to make informed choices. Many countries have developed their own national regulations for irradiated food labelling based on the standards set out by Codex. In countries like Canada and USA, irradiated food on sale must carry an international food irradiation symbol and a statement that the product is irradiated. Whereas, in Hong Kong, container containing irradiated food is required to be clearly and legibly labelled with the words “IRRADIATED” or “TREATED WITH IONIZING RADIATION” in English capital lettering and “輻照食物” in Chinese characters.

To monitor compliance with the labelling requirements on food irradiation, regular surveillance is conducted to determine if proper labelling has been made for food products that have been treated with ionizing radiation. From 2001-2008, no non-compliance case was identified.

Readers can find more information about the safety and labelling of irradiated food from the CFS's literature review on “Safety of Irradiated Food”.

Ingredients : Black Tea, Chrysanthemum and Wolfberry (IRRADIATED).
成份：紅茶、菊花及枸杞子(輻照食物)

在市場上出售輻照食物的標籤
Food label of irradiated food available on the market

食物事故點滴
Food Incident Highlight

豆奶中的碘質

Iodine in Soy Milk

二零零九年十二月二十四日，澳洲及新西蘭食品標準管理局就日本進口的Bonsoy豆奶發出回收通知，原因是有人有在飲用這款豆奶後出現甲狀腺毛病。該局呼籲公眾不要飲用Bonsoy豆奶，因為有關豆奶可能添加了一種海藻產品藉以提高其營養價值，因而引致碘質含量異常高(豆奶的碘質含量一般偏低)。

On 24 December 2009, the Food Standards Australia New Zealand (FSANZ) issued a recall notice on Bonsoy soy milk from Japan after a cluster of ten individuals presented with thyroid problems following the consumption of Bonsoy soy milk. The authority advised the public not to consume the product as unusually high levels of iodine were found (generally iodine levels in soy milk are low), possibly due to the addition of a seaweed product for enrichment purpose.

海產(特別是海藻)含豐富碘質。碘質是必需營養素，用來製造甲狀腺激素，對人體生長和發育十分重要。因此，碘質過多或不足都會引致甲狀腺毛病，病徵包括疲勞及體重下降等。

Seafood and particularly seaweed are good sources of iodine. Iodine is an essential nutrient and used for the production of thyroid hormones, which is necessary for growth and development. Therefore, either excessive iodine or deficiency in iodine can cause thyroid problems, with symptoms such as fatigue and weight loss.

食物安全中心(中心)在得悉Bonsoy豆奶有進口香港後，已發出食物警報，提醒消費者和業界不要飲用或售賣問題產品。Bonsoy豆奶曾分銷到本港多家連鎖超級市場和食店，有關店舖已立即將產品下架。中心將會就銷毀回收產品一事與分銷商聯絡。市民如長期飲用這款豆奶，可考慮諮詢醫生的意見。

The Centre for Food Safety (CFS) issued a food alert warning consumers and the trade not to consume or sell the affected product after learning that Bonsoy soy milk had been imported into Hong Kong. The product had been distributed to a number of chained supermarkets and food shops and was immediately withdrawn from shelf. The CFS would follow up with the distributors on disposal of the recalled product. Individuals may consider seeking medical advice, if they have prolonged intake of this product.

食物智庫
Food for Thought

海藻

Seaweed

海藻是香港常見的食物，現時市場上有各式各樣的海藻出售，有些作為零食享用，有些則用來配製湯或不同菜式。舉例說，海帶、昆布及裙帶菜常用作湯料，紫菜用作壽司材料，而瓊脂(海藻的提取物)則用於配製果凍和甜品。以下是有關安全享用海藻的建議，供消費者參考。

Seaweed is a food item commonly available in Hong Kong. There are many varieties of seaweeds on the market which may be eaten as snacks, used in soups and as food ingredients in different cuisines. To name a few examples, kelp, kombu and wakame are often used in soups, nori in sushi, agar (an extract from seaweed) in jelly and desserts. We have the following tips for consumers to enjoy seaweed safely.

主要的食物安全問題/益處 Significant Food Safety Concerns / Benefits	給市民的建議 Advice to the Public
<p>砷 (Arsenic) 羊棲菜(海草莖)是一種天然含有大量無機砷的海藻，其他種類海藻(例如黑海帶、昆布、紫菜和裙帶菜)則沒有這種特質。 Hijiki is a kind of seaweed that naturally contains very high levels of inorganic arsenic. This is not the case for other kinds of seaweed such as arame, kombu, nori and wakame. 無機砷具有毒性，大量攝入可引致急性中毒，長期過量攝入則會令神經、皮膚和血管受損，並增加患癌的風險。 Inorganic arsenic is the toxic form which may cause acute effects at high dose, and may cause damage to nerve, skin and blood vessels and increase risk of cancer over prolonged excessive intake.</p>	<ul style="list-style-type: none"> 留意羊棲菜(海草莖)那種黑色碎條狀的獨特外形，閱讀包裝上的標籤，切勿用作食物配料。 Note the distinctive black, shredded appearance of hijiki and read the labels on the food package. Do not use it as food ingredient. 避免食用羊棲菜(海草莖)。 Avoid consumption of hijiki.
<p>碘 (Iodine) 海藻含豐富碘，礦物質和微量元素。 Seaweed is a good source of iodine, minerals and trace elements. 攝取足夠碘對維持甲狀腺功能和促進人體生長發育十分重要，但攝取過量碘則可能會對甲狀腺造成不良影響。 Adequate intake of iodine is essential for thyroid function, growth and development, while excessive intake may cause adverse effects to the thyroid gland.</p>	<ul style="list-style-type: none"> 保持均衡飲食。 Maintain a balanced diet. 適量進食海藻和海藻產品，但避免食用羊棲菜(海草莖)。 Consume seaweed and seaweed products in moderation, but avoid hijiki.



黑海帶
Arame

羊棲菜
Hijiki

海帶
Kelp

昆布
Kombu

紫菜
Nori

裙帶菜
Wakame

風險傳達
工作一覽
Summary of
Risk Communication Work

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