食物安全焦點
Food Safety Focus

食物安全中心
Centre for Food Safety

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食物安全中心
風險評估組
科學主任鍾可欣女士報告

Reported by Ms Ho-yan CHUNG, Scientific Officer,
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台灣當局近期公布有數款入口燕麥片違反當地不得驗出除害劑草甘膦(在台灣稱「嘉磷塞」)的規定。本文將概述除害劑的規管情況及食物安全中心(中心)就此事採取的跟進行動。

對燕麥含草甘膦的規管

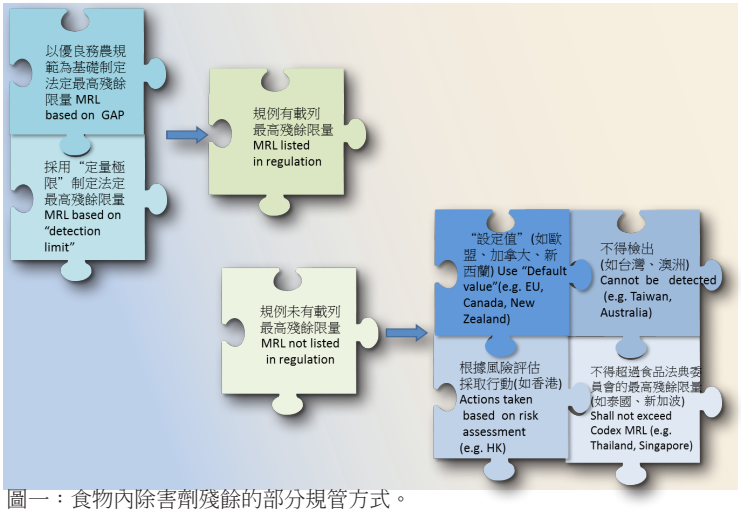
根據台灣當局的資料，台灣雖有訂定草甘膦在個別農作物（例如粟米及小麥）的最高殘餘限量(MRLs)（每公斤0.1至10毫克)，但不包括燕麥，原因有三：其一，台灣不生產燕麥；其二，燕麥出口國及台灣業界均沒有向當局提出訂定燕麥中草甘膦最高殘餘限量的要求；其三，台灣當局缺乏相關的科學試驗資料。

雖然台灣的燕麥片樣本違反當地規定，但驗出的草甘膦殘餘量(每公斤0.1至1.8毫克)其實遠低於食品法典委員會每公斤30毫克的標準，這亦是香港所採用的標準。

食品法典委員會的成員一般會採納食品法典委員會釐定的標準。但如成員國認為食品法典委員會的標準並不適合當地情況(例如對當地消費者有潛在的健康隱憂)，一般會根據遵照優良務農規範所作的田間試驗數據自行設定最高殘餘限量。由於各地情況不同(例如蟲害和環境狀況)，即使是同一種除害劑，在各地的優良務農規範亦未必相同，因此各地所制定的最高殘餘限量或有差異。

對於某些農作物而言，由於缺乏當地受監督的田間試驗數據，當局未能以優良務農規範為基礎制定註冊除害劑在這些農作物內的最高殘餘限量。在這種情況下，一些司法管轄區(例如澳洲、歐盟和新西蘭)會根據“定量極限”釐定最高殘餘限量。“定量極限”是除害劑檢測方法的檢測限值，同一種除害劑在不同農作物的數值或會不同。以毒死蜱為例，歐盟對毒死蜱在藍莓和茶中的限值分別是每公斤0.05毫克和0.1毫克。

對於規例沒有載列的除害



圖一：食物內除害劑殘餘的部分規管方式。
Figure1: Some regulatory approaches for pesticide residue in food.

Recently, the Taiwan authorities announced that several imported oatmeal products did not comply with their zero tolerance policy on glyphosate (a herbicide) glyphosate in oatmeal. This article provides an overview of the regulation of pesticides and follow-up actions taken by the Centre for Food Safety (CFS) regarding the incident.

Regulating Glyphosate in Oats

According to the Taiwan authorities, they have approved and set Maximum Residue Limits (MRLs) (0.1-10 mg/kg) for glyphosate in crops such as corn and wheat, but not in oats. This is because: 1) Taiwan does not produce oats; 2) neither oat-exporting countries nor the trade have proposed for such MRL to be established; and 3) no supportive scientific data have been made available to the Taiwan authorities.

Although the oatmeal samples in Taiwan did not comply with Taiwan regulation, the levels of glyphosate (0.1 - 1.8 mg/kg) detected were well below the international standard of 30 mg/kg set by Codex Alimentarius Commission (Codex), which is also adopted by Hong Kong.

Usually, Codex members would adopt the standards established by Codex. Members may, however, set their own standards when the Codex standards are inappropriate for their particular situations such as having potential health concerns for local consumers. Food safety authorities usually set MRLs for pesticide residues in food based on data obtained from supervised field trials conducted caccording to Good Agricultural Practices (GAP). As the conditions (e.g. pest types and environmental conditions) in different regions may vary, the GAP for individual pesticide may not be the same and therefore different MRLs may be established.

GAP-based MRLs for a registered pesticide in certain crops, however, may not be established due to a lack of local supervised field trial data. In these situations, some jurisdictions (e.g. Australia, EU, and New Zealand) set MRLs using “detection limits” instead. “Detection limits” are the limits of determination made possible by the laboratory and the values can be varied among different crops of a particular pesticide. For example, the limits of determination for chlorpyrifos in blueberries and teas in EU are 0.05 mg/kg and 0.1 mg/kg respectively.

For pesticides which are not listed in the regulation, some jurisdictions (e.g. Canada, EU, and

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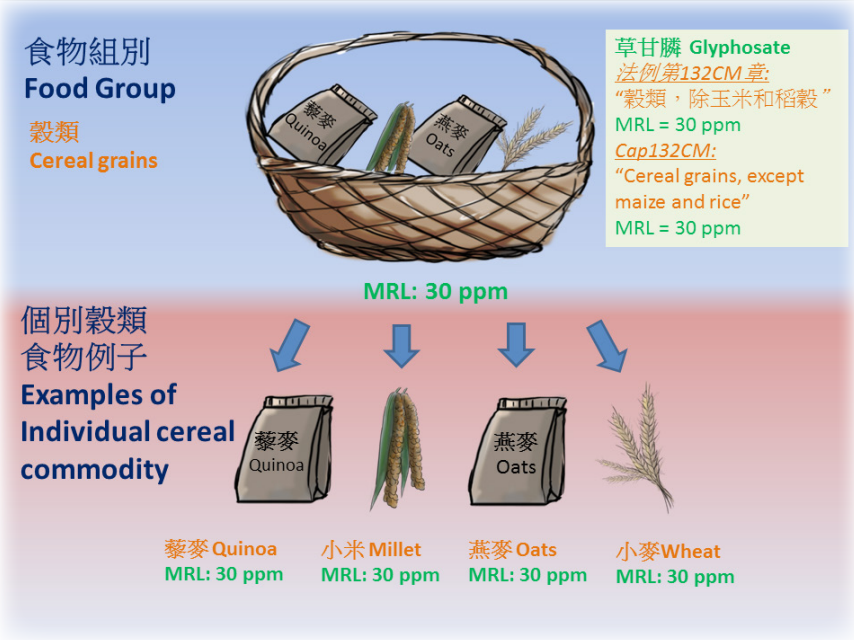
劑，部分司法管轄區（如加拿大、歐盟和新西蘭）會訂定“設定值”。“設定值”通常訂在一個非常低的水平，適用於規例沒有涵蓋的“除害劑－食物”組合。例如歐盟的設定值是每公斤0.01毫克。值得注意的是，“設定值”及“定量極限”與除害劑的安全使用沒有直接關係。除害劑殘餘量超過“設定值”及“定量極限”，並不表示公眾進食這些產品會對健康構成風險。

除了訂定設定值外，一些司法管轄區（如台灣和澳洲）的做法是除相關規例另有訂明最高殘餘限量外，其他除害劑殘餘一概不得檢出。這次台灣當局在燕麥片檢出草甘膦即屬此一情況。對於規例沒有訂明最高殘餘限量的“除害劑－食物”組合，其他做法還包括規定除害劑殘餘不得超過食品法典委員會的最高殘餘限量(如泰國和新加坡)，以及進行風險評估來確定食用有關食物會否危害或損害健康(如香港)(見圖一)。

本港規例

本港《食物內除害劑殘餘規例》(《規例》)的其中一個重點，是採納食品法典委員會的標準作為本地標準的骨幹，並同時參考食品法典委員會的食物分類方法。食品法典委員會把燕麥歸類為“穀類”這個食物組別。《規例》列明“穀類，除玉米和稻穀”這個組別的草甘膦最高殘餘限量為每公斤30毫克，該標準適用於燕麥。中心已發布食物分類指引，方便業界識別有關食品適用的除害劑殘餘限量。如《規例》沒有特別列明某“除害劑－食物”組合的殘餘限量，其所屬食物組別(如有的話)的殘餘限量均適用於該食物(見圖二)。



圖二：《規例》中食物組別“穀類”的標準適用於屬於該組別的所有食物，包括燕麥。

Figure 2: The standards specified for the food group “Cereal grains” in the Regulation are applicable to all food items under this group including oats.

中心採取的行動

中心已向台灣當局了解事件，並聯絡了主要進口商及派員巡查市面主要零售點，未發現市面上有受影響的燕麥片出售。為審慎起見，中心已在市面上抽取13個燕麥片（包括桂格牌）樣本進行草甘膦測試，驗出的草甘膦含量介乎每公斤0.14至1.7毫克，合乎食品法典委員會標準及香港的法定標準。

注意要點

1. 除非不適合當地情況，否則食品法典委員會的成員一般會採納食品法典委員會釐定的標準。
2. 一些司法管轄區可能會因應科學及或實際的因素而自行釐定除害劑殘餘的標準。
3. 即使是按優良務農規範正確施用除害劑，農作物亦有可能殘留小量除害劑。

給業界的建議

- 按優良務農規範的規定施用除害劑，確保只使用足以防治蟲害的最少分量。
- 確保所售食物符合香港法例。

給市民的建議

- 按一般食用量進食有關燕麥片產品不會影響健康，市民無須憂慮。

New Zealand) have implemented “default values”. “Default values” are usually set at a very low level which apply where no specific MRL is available. For example, EU has established a default value of 0.01 mg/kg. It is important to note that both the “detection limits” and “default values” have no relevance to the safe usage of pesticides concerned. In addition, pesticide residual levels above which do not indicate that public health is at risk after consuming these products.

Instead of using the approach of default values, some jurisdictions (like Taiwan and Australia) stipulate that apart from those with MRLs specified in relevant regulation, detection of pesticide residues in food is not allowed. That is the case for oatmeal samples with detectable glyphosate in Taiwan. Other regulatory approaches for MRL not listed in regulation include stipulating that pesticide residue shall not exceed Codex MRLs (like Thailand and Singapore); and conducting risk assessment to decide if consumption of the food concerned is dangerous or prejudicial to health (like Hong Kong) (See Figure 1).

Local Regulation

One of the key features of the Pesticide Residues in Food Regulation (Cap. 132CM) (the Regulation) is to adopt the Codex standards as the backbone and therefore make reference to the Codex food classification system in parallel. Oats are classified under the Codex food group of “Cereal grains”. The Regulation specifies the MRL for glyphosate in “Cereal grains, except maize and rice” at 30 mg/kg which is applicable to oats. The CFS has issued a set of food classification guidelines to facilitate members of the trade in identifying the appropriate limits that are relevant to the food commodities concerned. If there is no specific limit for a pesticide-food pair, the limit specified for its corresponding food group, if any, are applicable (see Figure 2).

Actions Taken by the CFS

The CFS has contacted the Taiwan authorities for more information, contacted major local importers and conducted sales checks at major local outlets. No affected batches of the oatmeal products were found on sale in the local market. For the sake of prudence, the CFS has conducted a testing for glyphosate in 13 oatmeal samples (including Quaker brand products) and all samples (glyphosate residue levels between 0.14 to 1.7 mg/kg) met the Codex limits and the statutory standards of Hong Kong.

Key Points to Note

1. Members of the Codex would usually adopt the Codex standards unless these standards are considered not appropriate for local situation.
2. Some jurisdictions may establish their standards on pesticide residues after taking into account scientific and/or practical factors.
3. Small amounts of pesticide residues may remain in crops even after proper application according to GAP.

Advice to the Trade

- Observe GAP to ensure that only the minimum amount of pesticide is applied to commodities for achieving pest control need.
- Ensure the food sold complies with the laws of Hong Kong.

Advice to the Public

- There is no cause for concern over usual consumption of the concerned oatmeal products.

食物安全平台
Food Safety Platform

水果的外衣——蠟
The Coat on Fruits – Wax

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, Risk Assessment Section, Centre for Food Safety

水果含膳食纖維和多種維他命，是健康飲食的重要組成部分。可惜新鮮水果大多容易腐壞，保質期很短。為了防止新鮮水果在採收後水分蒸發和腐爛變質，以及讓水果賣相更佳，果商會給一些水果打蠟。

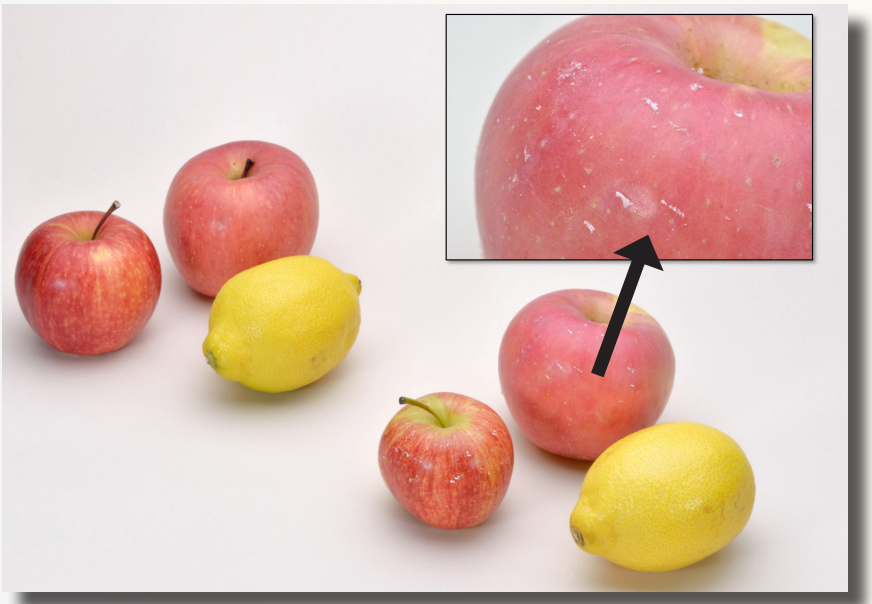
水果的天然保護蠟

水是新鮮水果的主要成分，佔總重量的八成至九成。水果表皮有一層天然的蠟，可以減少水分流失，令水果表面光亮。但是，水果在採收後會先洗去泥污才拿去出售，這個過程或會把水果的部分天然保護蠟洗去。水果失去過多水分不但會變得皺縮及或枯凋，還會令質感變差，影響外觀和食用質素。

給水果打蠟的作用和過程

為了補充或取代水果的天然蠟，果商在蘋果、柑橘、桃子、蜜桃等水果上人工加上一層蠟。這層蠟不僅可以減少水分流失，提高光澤度，讓水果好看，還可以保鮮，延長水果在採收後的保質期。蠟把水果表皮上的小孔和凹陷處封起來，在水果表面形成一層保護膜，免受真菌和細菌侵入。另外，蠟還會形成防水層，令病原體不容易滋生繁殖。

給水果打蠟就是在水果表面加上一層薄薄的食用蠟，做法有很多種，包括人手塗上，把水果蘸或浸在蠟中或用自動滾筒打蠟機等。在打蠟過程中，只須用輕微分量的蠟在農產品表面加上一層很薄的塗層。一般來說，每件加了蠟的農產品只有一兩滴蠟。



沒有打蠟的水果(圖左)和打了蠟的水果(圖右)同樣光鮮亮澤。從打了蠟的蘋果上刮出的蠟屑(右上)。

Unwaxed fruits (left) and waxed fruits (right) both have bright shiny surfaces. A waxed apple with bits of its wax scraped off (top right).

如果水果本身品質欠佳，打蠟對提高品質是沒有幫助的。太多蠟反而會影響水果的品質。舉例來說，加了蠟的水果於過度受熱或遇上大量濕氣時表皮會浮現白色的蠟，打了蠟的水果(特別是加了大量蟲膠的水果)從冷藏庫取出到較高溫的環境時通常會出現這種情況。這是因為水分的冷凝作用令部分蟲膠溶解，導致水果表面出現肉眼可見的白色蠟質。在一些情況下，打蠟太多會妨礙水果的氣體交換，令水果產生異味。

打蠟的原料

打蠟的原料可通過人工合成或由天然原料提取而來。天然原料一般來自昆蟲(例如蜜蠟和蟲

Fruits provide sources of dietary fibre and vitamins and form an important part of our healthy diet. However, many fresh fruits are highly perishable with short shelf lives. To protect fresh produce from dehydration and postharvest decay and also to enhance their appearances, fruit producers may apply wax on some of these products.

Natural Wax as Protective Coat of Fruit

Water is the principal component of fresh fruits which constitutes between 80 to 90% of a produce's fresh weight. Fruits are covered by a layer of natural wax which acts as a barrier to reduce moisture loss and at the same times give the fruit a shiny surface. However, after a fruit is harvested and is being washed to clean off dirt and soil prior to sale, substantial amount of the natural wax on its surface may be removed. Excessive loss of moisture from fruits may result in product shrivelling and/or wilting as well as undesirable textural changes which negatively affect the appearance and edible quality of the product.

Purpose and Process of Fruit Waxing

To supplement or replace the natural protective coat on fruit, wax is artificially applied to produce such as apples, citrus, peaches, nectarines. The wax applied, not only reduces the moisture loss and enhances the appearance of the product by adding a bright sheen, but also protects the fruits from postharvest decay which extends their shelf-life. Waxing can seal small cracks and dents in the rind or skin and establishes a barrier against the entrance of fungal and bacterial pathogens into the product. It also creates a non-water compatible surface which is not conducive to growth and development of pathogens.

Waxing of fruit is the process of applying a thin layer of edible wax to the outer surface of the product. It can be done in several different ways, ranging from manual rubbing of the product surface, dipping or submergence in wax, to automated roller brush application. During the process, only a tiny amount of wax is required to provide a microscopic coating surrounding the entire article/crop. In general, each piece of waxed produce has only a drop or two of wax.

Nonetheless, waxing does not improve the quality of inferior products. Heavy application of wax may, on the contrary, adversely affect the quality of fruits. For instance, wax whiting (also called chalking) may occur on the surface of fruits if they have been subjected to excessive heat or moisture. This often occurs after removal of the waxed products, in particular those heavily coated with a wax known as shellac, from cold storage to higher temperatures. The condensation of the moisture causes the shellac to become partly solubilised and subsequently results in white deposits that are translucent in appearance. On other occasions, heavy application of wax can block fruit gas exchange, leading to the development of off-flavours.

Waxing Materials

Waxing materials can be made synthetically or derived from natural sources. Natural waxes may be obtained from insects (e.g. beeswax and shellac) or from

膠)或植物(例如巴西棕櫚蠟和小燭樹蠟)。這些蠟屬於食物添加劑，國際食物安全機構"聯合國糧食及農業組織／世界衛生組織聯合食物添加劑專家委員會"已對其作安全評估，認為把這些蠟用於食物中沒有安全問題。聯合國糧農組織指出，打蠟是水果包裝的正常工序之一。澳洲、新西蘭、歐盟和美國等地均准許在水果等食物上加上各種蠟，但須遵從優良製造規範或特定的最高限量。

打了食用蠟的水果一般可以安全食用。為了盡享吃新鮮水果的益處，市民應光顧可靠的商販，並在去皮、切開及食用前，以流動的自來水把水果(包括不吃的外皮)上的污垢清洗乾淨。

plant (e.g. carnauba wax and candelilla wax). These waxes, as kinds of food additives, have been evaluated by the Joint FAO/WHO Expert Committee on Food Additives, an international food safety authority and are considered that their uses in foods are not of safety concern. According to Food and Agriculture Organization of the United Nations, waxing is one of the general operations in the fruit packinghouse. Different types of waxes are also permitted to be applied on foods including fruits, in accordance to Good Manufacturing Practice or within specified maximum levels, in different countries, e.g. Australia, New Zealand, the European Union and the United States.

Fruits coated with food grade waxes are generally safe to eat. To enjoy the benefits of consuming fresh fruits, always purchase them from reliable shops and wash them (including those with skins and rinds that are not to be eaten) thoroughly under running tap water to remove any lingering dirt before peeling, cutting and eating.

食物事故點滴
Food Incident Highlight

布魯氏菌病與羊肉製品

衛生署衛生防護中心在五月中錄得一宗布魯氏菌病個案。患者早前在內地逗留期間用羊的內臟和羊肉煮湯，食用後不時腹痛和發燒。

布魯氏菌病是布魯氏桿菌屬由動物(例如羊、牛、狗和豬)傳至人類所引致的細菌感染，潛伏期一般為五至六十天，但亦可長至數月。布魯氏菌病的病徵包括發燒、頭痛、背痛、關節痛和身體虛弱等。嚴重的感染可能會影響大腦、心臟和其他器官。

有布魯氏菌病記錄的地區不時有人因進食未經巴士德消毒的乳製品，生或未經煮熟的肉類及內臟而感染布魯氏菌病。有些患者則是在處理受感染的肉類時經皮膚傷口接觸細菌而受到感染。

為了預防感染布魯氏菌病，市民應：1)避免進食未經巴士德消毒的奶類製品，未經煮熟的肉類和內臟；以及2) 在處理食物時妥善覆蓋傷口。

Brucellosis and Lamb Products

In mid-May, the Centre for Health Protection of the Department of Health recorded a case of brucellosis. The patient had prepared and consumed soup made with lamb organ and meat during a stay in the Mainland earlier, and developed on and off abdominal pain and fever subsequently.

Brucellosis is a bacterial infection of the genus Brucella transmitted from animals (e.g. sheep, cattle, dogs and pigs) to humans. The usual incubation period is 5 – 60 days, but can be as long as several months. The symptoms of brucellosis include fever, headache, back pain, joint pain, physical weakness, etc. Severe infections may affect the brain, the heart and other organs.

Sporadic brucellosis cases related to consumption of unpasteurised dairy products, raw or undercooked meats and internal organs had been reported in humans in regions where the disease was recorded. Occasionally, infection through breaks in the skin may also occur during handling of infected meat.

To prevent brucellosis infection, the public are urged to 1) avoid consuming unpasteurised dairy products, undercooked meats and internal organs; and 2) cover wounds when preparing food.

湯水鹽含量大不同

吃鹽太多會增加患高血壓、心臟病和中風的風險。世界衛生組織建議成人每天攝入不多於5克鹽(2000毫克鈉)。湯水是本地成年人從食物攝取鈉的第二大主要來源，僅次於醬料及調味品。

食物安全中心與消費者委員會合作，在市面上抽取了130個本港較常見的湯水樣本（共13款）進行鈉含量測試。結果顯示，亞洲湯水(如冬蔭功和麵豉湯)、西式湯水(如羅宋湯)和中式湯羹(如酸辣湯)的鹽含量高於中式清湯(如粉葛湯和響螺煲雞湯)。喝一碗鹽含量最高(多於5克)的冬蔭公湯（240克）已超過每日建議攝取的鹽分限量。

業界在烹調這些湯水時應盡量調低用鹽的分量。市民在外出飲湯時應反映想盡量少鹽，並留意湯水的分量；在家自製湯水時則應少加鹽及其他調味料，最好是一點都不加。

When It Comes to Salt, Not All Soups are Created Equal

Consuming too much salt increases the risk of high blood pressure, heart attack and stroke. The World Health Organization has recommended adults limit their salt intake to 5g (sodium 2 000mg) a day. "Soups" is the second major contributor next to "sauces and condiments" to the dietary salt intake of the local adult population.

The Centre for Food Safety and the Consumer Council jointly studied 130 samples (13 types) of popular soups available in local market. Asian-style-(e.g. Tom Yum Goong soup and miso soup), Western-style-(e.g. Borsch), and Chinese-style thick soup (e.g. Hot and sour soup) had higher salt contents than Chinese-style thin soup (e.g. Kudzu root soup and Chicken with conch soup). Consuming a bowl (240g) of Tom Yum Goong soup with highest salt content (>5g) alone exceeded the recommended daily salt intake.

There is certainly room for the trade to reduce salt in soups. Consumers can ask for "less salt" and be aware of the portion size when having soups in restaurants. When making soups at home, add less salt and other condiments, or even better, do not add any.

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

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