

Recent Media Report of Contamination of Bottled Water with Microplastics

最近傳媒有關瓶裝水受微塑膠污染的報導

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Background

背景

- On 16th March 2018, local media had reported the results of a study by a US university (SUNY Fredonia) on the presence of microplastics in bottled water from different parts of the world as provided by a NGO news agency (Orb Media).
- 在2018年3月16日，本地媒體報導了美國一所大學（紐約州立大學弗雷多尼分校）研究世界各地瓶裝水中微塑料含量的結果。該研究是經由一個非政府組織通訊社（Orb Media）發佈。

Background (2) 背景 (2)

■ Bottled water samples tested:

- Purchased from 9 countries
 - China, USA, Brazil, India, Indonesia, Mexico
- 11 brands, 27 lots, 259 bottles
 - Includes international and local brands

■ 測試的瓶裝水樣本：

- 從9個國家購買
 - 中國，美國，巴西，印度，印尼，墨西哥
- 11個品牌，27個批次，259瓶
 - 包括國際和當地品牌

Background (3) 背景 (3)

■ Counting of microplastic particles:

- Samples filtered after staining with Nile Red.
- $>100\text{ }\mu\text{m}$: count and identify shape and type of plastic.
- $6.5 - 100\text{ }\mu\text{m}$: count by software.
- Background levels are subtracted.

■ 計算微塑料顆粒數目：

- 用 Nile Red 染色後過濾樣本。
- 直徑 $>100\mu\text{m}$ ：計算數目和識別塑料的形狀和種類。
- $6.5 - 100\mu\text{m}$ ：通過軟件計算數目
- 減去背景水平

Results 結果

- 93% of the samples contained various levels of microplastic contamination.
- Density of microplastics in the samples varies widely.
 - 0 to 10,000+ microplastic particles (MPP)/L.
 - average 325 MPP/L (10.4 MPP/L for $>100\mu\text{m}$, 315 MPP/L for 6.5 to $100\mu\text{m}$)
- 93%的樣本含有不同程度的微塑膠污染。
- 微塑膠在樣本中的密度變化很大
 - 每公升0至10,000+粒微塑膠
 - 平均每公升325粒 ($>100\mu\text{m}$:每公升10.4粒, 6.5至 $100\mu\text{m}$:每公升315粒)

Results (2) 結果 (2)

- For larger particles ($>100\text{ }\mu\text{m}$):
 - 66% are fragments, 13% are fibres and 12% are films
 - 54% are polypropylene (PP), 16% are nylon, 10% polyethylene (PE)
- 較大 ($> 100\mu\text{m}$) 的粒顆:
 - 66%是碎片，13%是纖維，12%是薄膜
 - 54%是聚丙烯（PP），16%是尼龍，10%聚乙烯（PE）

Conclusions by the Researchers

研究人員的結論

- The microplastics found is at least partly from the packaging materials &/or bottling process, after comparing with a study on microplastics in municipal water.
- The issue is likely to be common worldwide.
- 與以前食水中微塑膠的研究結果相比之後，發現至少部分微塑膠來自包裝材料和/或裝瓶過程。
- 這個現象可能在世界各地都存在。

Issues Raised by the News Agency

新聞社提出的問題

- Issues not yet confirmed by scientific research:
 - Most microplastics may exit the intestine without interactions.
 - Some may pass through intestinal wall into lymph system, blood stream etc. but the health burden is currently unknown.
 - May have false positive counts
- 尚待科學驗證的問題：
 - 大多數微塑膠可以在沒有相互作用的情況下離開腸道。
 - 有些可能通過腸壁進入淋巴系統、血管等。但對健康的影響未明。
 - 微塑膠數目方面可能有假陽性。

Relevant Codex Standards

食品法典委員會相關的標準

- General Standard for Bottled/Packaged Drinking water (Other than Natural Mineral Waters) (Codex Stan 227-2001)
- Standard for Natural Mineral Waters (Codex Stan 108-1981)
- Did not cater for the issue of microplastics.
- 食品法典委員會有兩個相關的標準(瓶裝水、礦泉水)
- 當中並沒有微塑膠相關的條文。

Relevant WHO Standard

世界衛生組織相關的標準

- WHO Guidelines for Drinking-water Quality, 4th edition (incorporating the 1st addendum), 2017.
- Does not cover microplastics, including the section on “Packaged drinking-water”.
- 世衛飲用水質量指南，第4版(包含第1個補遺)，2017。
- 並沒有微塑膠相關的條文，包括“包裝飲用水”部分。

Comments & Sharing by the Food Trade

食品業界的建議和分享

- Comments and sharing of relevant experiences by members of the trade welcomed.
- 歡迎食品業界的建議和分享相關經驗。

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Thank you
謝謝

- $1\ \mu\text{m}$ (微米) = $0.001\ \text{mm}$ (毫米)
- $6.5\ \mu\text{m}$ (微米) = $0.0065\ \text{mm}$ (毫米)
- $100\ \mu\text{m}$ (微米) = $0.1\ \text{mm}$ (毫米)
- $100\ \text{nm}$ (納米) = $0.0001\ \text{mm}$ (毫米)

- Diameter of human hair (人類頭髮直徑):
 $30\ \text{to}\ 100\ \mu\text{m}$ (微米)
- Nano particles (納米粒子): usually $<100\ \text{nm}$ (納米) in one dimension