

食物中的環氧乙烷

Ethylene oxide in food

業界諮詢論壇

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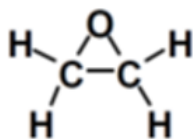
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甚麼是環氧乙烷？

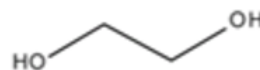
What is ethylene oxide?

環氧乙烷

- ✦ 是人造的有機化合物
- ✦ 在常溫常壓下為有甜味的無色氣體
- ✦ 可水解為乙二醇和2-氯乙醇



Ethylene oxide
(環氧乙烷)



(A) ethylene glycol

(乙二醇)



(B) 2-chloroethanol

(2-氯乙醇)

Ethylene oxide

- ✦ is a man-made organic compound
- ✦ is a colorless gas with sweet odour at room temperature and pressure
- ✦ can be hydrolysed to ethylene glycol and 2-chloroethanol

環氧乙烷的用途

Use of ethylene oxide

✿ 環氧乙烷可用於

- ✦ 作為中間成分以進一步製造工業產品，例如聚乙二醇，以及各種乙醇胺和乙二醇醚
- ✦ 熏蒸目的，包括消毒醫療的設備，以及控制乾燥食品例如草藥、香料、堅果和油性種子中的昆蟲和微生物（真菌和細菌）

✿ Ethylene oxide can be used

- ✦ as an intermediate ingredient in the further manufacture of industrial products e.g. polyethylene glycols as well as various ethanol-amines and glycol-ethers
- ✦ for fumigation purposes including the sterilisation of medical equipment and the control of insects and microorganisms (fungi and bacteria) in dry food products, such as herbs, spices, nuts and oily seeds

環氧乙烷的危害

Hazard of ethylene oxide

✿ 動物研究發現，環氧乙烷對動物造成的影響：

- ✦ 神經系統毒性 (例如減少運動能力和導致癱瘓)
- ✦ 生殖系統毒性 (例如增加異常精子的百分比和後代先天性畸形的發生率)
- ✦ 基因毒性 (例如導致脫氧核糖核酸損傷和基因突變)
- ✦ 致癌性 (增加腫瘤的發病率)

✿ Effects of ethylene oxide in animal studies:

- ✦ Neurotoxicity (e.g. reduced locomotor activity and paralysis)
- ✦ Reproductive toxicity (e.g. increased percentage of abnormal sperm and increased incidence of congenital malformations in offspring)
- ✦ Genotoxicity (e.g. DNA damage and gene mutations)
- ✦ Carcinogenicity (increased incidence of tumours)

國際癌症研究機構對環氧乙烷的分類

Classification of ethylene oxide by IARC

✿ 國際癌症研究機構

- ✿ 把環氧乙烷分類為第 1 組物質（即“令人類患癌”）
- ✿ 在實驗動物中有足夠的證據表明環氧乙烷具致癌性
- ✿ 實驗動物與人類致瘤反應相似

✿ The International Agency for Research on Cancer (IARC)

- ✿ has classified ethylene oxide as Group 1 agent (i.e. “Carcinogenic to humans”)
- ✿ there is sufficient evidence in experimental animals for the carcinogenicity of ethylene oxide
- ✿ the tumorigenic response in experimental animals is similar to that in humans

建議和標準

Recommendation and standards

- ✿ 歐盟指出，由於環氧乙烷是一種具基因毒性的致癌物，因此不可能在沒有風險及無法確定安全閾限值的情況下訂定出健康參考值
- ✿ 糧食及農業組織/世界衛生組織農藥殘留聯合專家會議，以及美國和澳大利亞的監管機構並未就環氧乙烷訂定健康參考值
- ✿ 食品法典委員會並未訂定食品中環氧乙烷的標準
- ✿ European Food Safety Authority (EFSA) stated that since ethylene oxide is a genotoxic carcinogen, deriving a health-based reference value without risk is not possible as no safety threshold can be established.
- ✿ The FAO/WHO Joint Meeting on Pesticide Residues (JMPR) and the regulatory authorities in the United State (US) and Australia has not established a health-based guidance value
- ✿ The Codex Alimentarius Commission (Codex) has not established a standards on ethylene oxide in food

國際的監管 (一)

International regulation (I)

✿ 美國和加拿大

- ✦ 訂定香料、乾香草、乾蔬菜和芝麻中環氧乙烷的最大殘留限量為 7 ppm
- ✦ 美國更訂定核桃中環氧乙烷的最大殘留限量為 50 ppm

✿ 歐盟和英國

- ✦ 訂定大約 300 種食品中環氧乙烷和2-氯甲苯酚之和的最大殘留限量為分析測定的下限，即是0.02至0.1 ppm

✿ The US and Canada

- ✦ Has established MRLs for ethylene oxide in spices, dried herbs, dried vegetables and sesame seeds at 7 ppm
- ✦ the US has also established a MRLs for ethylene oxide in Walnuts at 50 ppm

✿ The EU and United Kingdom (UK)

- ✦ Establish MRLs for the sum of ethylene oxide and 2-chlororehtnaol in some 300 food at 0.02 to 0.1 ppm, which are the lower limits of analytical determination

國際的監管 (二)

International regulation (II)

✿ 澳大利亞

- ✦ 2003 年，環氧乙烷從《食品標準法典》中刪除，及不再允許用作處理在澳大利亞銷售的食品

✿ 中國大陸

- ✦ 環氧乙烷並未列入食品安全國家標準《食品中最大殘留限量》（GB2763-2021），因此在食品中不允許作為農藥使用

✿ Australia

- ✦ In 2003, ethylene oxide was removed from the Food Standards Code and no longer allowed to be used as a treatment for foods sold in Australia

✿ Mainland China

- ✦ EO is not included in the National Food Safety Standard for Maximum Residue Limits in Foods (GB2763-2021), and hence is not allowed to be used as pesticide in foods.

本地的監管 (一)

Local regulation (I)

✿ 《食物內除害劑殘餘規例》 (第132CM章) 《規例》

- ✦ 《規例》的附表1列明某些"除害劑－食物"組合的最高殘餘限量／最高再殘餘限量（即指明食品中允許的指明除害劑殘餘的最高濃度）。如化驗結果驗出的除害劑殘餘超出其最高殘餘限量／最高再殘餘限量，即屬違法
- ✦ 就附表1沒有指明的最高殘餘限量／最高再殘餘限量的除害劑殘餘而言，《規例》規定，除獲豁免除害劑外，只有在食用有關食物不會危害或損害健康的情況下，才可進口或售賣。食物安全中心會根據風險評估確定食用有關食物會否危害或損害健康

✿ Pesticide Residues in Food Regulation (Cap. 132CM, "the Regulation")

- ✦ The Regulation specifies in Schedule 1 a list of MRLs/EMRLs for certain pesticide-food pairs, i.e. the maximum concentration of specified pesticide residues permitted in specified food commodities . It will be an offence under the Regulation if the laboratory test result shows that the level of pesticide residues in the food exceeds the prescribed pesticide residue limits
- ✦ For pesticide residues with no specified MRLs/EMRLs in Schedule 1, the Regulation stipulates that except for exempted pesticides, import or sale of food containing such pesticide residues is allowed if the consumption of the food concerned is not dangerous or prejudicial to health based on risk assessment conducted by CFS

本地的監管 (二)

Local regulation (II)

✿ 《公眾衛生及市政條例》 (第132章) 第54條

- ✦ 任何在本港出售擬供人食用的食物，不論進口或本地生產，必須適宜供人食用。生產商應確保食物在製作過程中不受除害劑污染
- ✦ 如在食肆出售的食物被發現除害劑殘餘有違規的情況，食物安全中心在具備足夠證據下，會向相關人士提出檢控，包括食肆或食物加工廠的持牌人、食物供應商等，但不包括除害劑供應商

✿ Section 54 of the Public Health and Municipal Services Ordinance (Cap. 132)

- ✦ food for sale in Hong Kong, whether it is imported or locally produced, must be fit for human consumption. Food manufacturers should ensure that their products will not be contaminated by pesticides during the manufacturing process.
- ✦ if CFS has sufficient evidence to prove that the pesticide residues in the food sold in a restaurant breaches the law, the persons concerned including the licensee of the restaurant or the food processing plant, the food supplier, etc. but not the pesticide supplier, will be prosecuted.

現時的本地情況（一）

Current situation in Hong Kong (I)

✿ 環氧乙烷

- ✦ 沒有指明的最高殘餘限量／最高再殘餘限量在《食物內除害劑殘餘規例》（第132CM章）的附表1
- ✦ 不是《規例》（第132CM章）列明獲豁免的除害劑
- ✦ 目前並沒有適用的健康參考值，以進行定量風險評估
- ✦ 未能根據風險評估確定食用有關食物不會危害或損害健康

✿ Ethylene oxide

- ✦ has no specified MRLs/EMRLs in Schedule 1 in the Pesticide Residues in Food Regulation (Cap. 132CM)
- ✦ is not an exempted pesticides listed in the Regulation (Cap. 132CM)
- ✦ has no available health-based guidance value for conducting the quantitative risk assessment
- ✦ cannot determine the consumption of the food concerned is not dangerous or prejudicial to health based on risk assessment conducted

現時的本地情況 (二)

Current situation in Hong Kong(II)

中心新聞稿 CFS's press release	
日期 Date	新聞標題 Headline
21.6.2022	食安中心呼籲市民不要食用兩款可能含有環氧乙烷的法國進口雪糕 CFS urges public not to consume two kinds of ice cream from France with possible presence of ethylene oxide
10.7.2022	食安中心呼籲市民不要食用數款可能含有環氧乙烷的法國進口雪糕 CFS urges public not to consume several kinds of ice cream from France with possible presence of ethylene oxide
19.7.2022	食安中心呼籲市民不要食用一款可能含環氧乙烷的日本進口杯麵 CFS urges public not to consume kind of cup noodles imported from Japan with possible presence of ethylene oxide
4.8.2022	食安中心呼籲市民不要食用兩款可能受環氧乙烷污染的法國進口雪糕 CFS urges public not to consume two kinds of ice cream from France with possible contamination with ethylene oxide
6.8.2022	食安中心繼續跟進可能受環氧乙烷污染的法國進口雪糕 CFS continues to follow up on ice cream from France with possible contamination with ethylene oxide
27.9.2022	食安中心在印尼進口預先包裝即食撈麵樣本驗出環氧乙烷 CFS finds ethylene oxide in prepackaged instant tossed noodle samples from Indonesia

現時的本地情況（三）

Current situation in Hong Kong (III)

✿ 食安中心在印尼進口預先包裝即食撈麵樣本驗出環氧乙烷 (27.9.2022)

- ✦ 國際癌症研究機構目前將環氧乙烷歸類為第一組致癌物
- ✦ 根據《食物內除害劑殘餘規例》（第132CM章），任何人不得售賣含有危害或損害健康的除害劑殘餘食物供人食用
- ✦ 違例者最高可被判罰款五萬元及監禁六個月

✿ CFS finds ethylene oxide in prepackaged instant tossed noodle samples from Indonesia (27.9.2022)

- ✦ The International Agency for Research on Cancer classified ethylene oxide as a Group 1 carcinogen
- ✦ According to the Pesticide Residues in Food Regulation (Cap 132CM), a food for human consumption containing pesticide residue may only be sold if consumption of the food is not dangerous or prejudicial to health
- ✦ An offender is liable to a maximum fine of \$50,000 and to imprisonment for six months upon conviction

參考

Reference

- ✿ 世界衛生組織《簡明國際化學評估文件 54: 環氧乙烷》
<https://incchem.org/documents/cicads/cicads/cicad54.htm>
- ✿ 常見的問題
https://www.cfs.gov.hk/tc_chi/whatsnew/whatsnew_fstr/whatsnew_fstr_21_Pesticide_FAQ.html
- ✿ 食物警報 / 致敏物警報: 印尼進口預先包裝即食撈麵樣本驗出環氧乙烷
https://www.cfs.gov.hk/tc_chi/whatsnew/whatsnew_fa/2022_491.html
- ✿ World Health Organisation - Concise International Chemical Assessment Document 54: ETHYLENE OXIDE
[https://incchem.org/documents/cicads/cicad54.htm](https://incchem.org/documents/cicads/cicads/cicad54.htm)
- ✿ Frequently Asked Questions
https://www.cfs.gov.hk/english/whatsnew/whatsnew_fstr/whatsnew_fstr_21_Pesticide_FAQ.html
- ✿ Food Alerts / Allergy Alerts: Ethylene oxide found in prepackaged instant tossed noodle samples from Indonesia
https://www.cfs.gov.hk/english/whatsnew/whatsnew_fa/2022_491.html

謝謝

Thank you