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Dioxins

What is it?

Dioxins are a large group of over 200 organic chemicals widely occurring in the environment. Dioxins are not intentionally created but are generally by-products of combustion processes, both man-made and natural—such as waste incineration, power plants burning coal, volcanic activity and forest fires, and even cigarette smoke and automobile exhaust.

Where do we find it?

Dioxins are universally present in the environment. The U.S. Environmental Protection Agency (EPA) has estimated that over 95 percent of human exposure to dioxins results from dietary intake of animal fats. The major food sources for dioxin exposure include fish, poultry, meats, and dairy products.[1]

Is it safe? What is the safe level of use?

Short term, or acute, exposure to high levels of dioxins may result in a skin lesion or altered liver function, while long term, or chronic, exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)—the most toxic chemical in the dioxin group—has been classified as a known human carcinogen by the World Health Organization (WHO) International Agency for Research on Cancer (IARC). [2]

The EPA, in 2012, developed a daily dietary reference dose of 0.7 picograms (pg) per kilogram (kg)-day [3] which is about three times lower, more protective, than the World Health Organization/United Nations recommendation. [2]

Why is there a concern?

International food recalls have stemmed from dioxin-contaminated animal feed which was fed to animals produced for human consumption.[2] While dioxin-related food recalls are not a frequent occurrence, the following are examples: the detection of increased dioxin levels in milk in 2004 in the Netherlands, in which the source was contaminated clay found in the animal feed; and in 2008, Ireland recalled many tons of pork meat and pork products with high dioxin levels stemming from contaminated animal feed.

What is being done?

FDA has been monitoring dioxin levels in food since 1995, but has not yet published estimates of human exposure to dioxins; other countries have estimated human dioxin exposure ranging from 0.2 to 3.5 pg/kg-day.[1]

Strict monitoring of industrial manufacturing during the last thirty years, in Europe and the US, has led to a significant reduction of dioxins released into the environment.

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What can I do?

Since dioxins are stored in the fat of consumed animal products, FDA recommends following the Dietary Guidelines for Americans, 2010 recommendations of consuming no more than 20-35 percent of one's daily total calories from fat with less than 10 percent of those calories from saturated fat. [4]

Summary:

FDA, in conjunction with the European Union, EPA and USDA, work together to address international and domestic concern regarding dioxins in animal feed. Additionally, the U.S. and other countries are working to reduce dioxin exposure at the source through stricter monitoring of industrial manufacturing.

Referenced sources for Dioxins:

[1] Winter C.K. (2013) Food Safety: Other Contaminants. In: Caballero B. (ed.) Encyclopedia of Human Nutrition, third edition, Volume 2, pp. 342-346. Waltham, MA: Academic Press

[2] http://www.who.int/mediacentre/factsheets/fs225/en/index.html

[3] http://www.epa.gov/iris/subst/1024.htm

[4] http://www.fda.gov/Food/FoodborneIllnessContaminants/ChemicalContaminants/ucm077524.htm

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