



The Alliance for a HEALTHY TOMORROW

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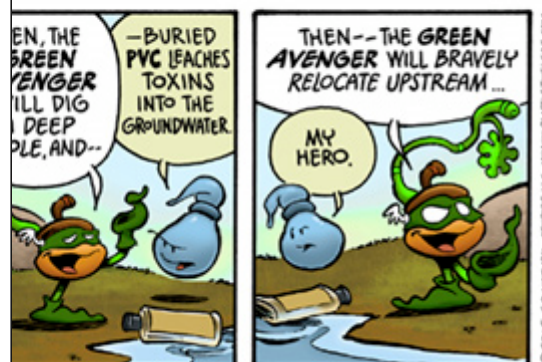
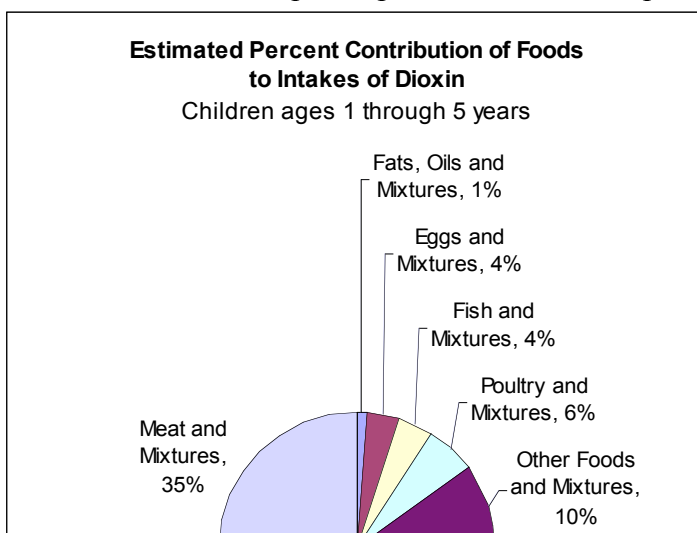
Dioxin – in Our Food, Our Bodies

Dioxin is a collection of more than 200 extremely toxic and very persistent chemicals that includes chlorinated dibenzo-furans and dibenzo-dioxins as well as related compounds similar in structure and effects. Dioxin persist in the environment and in our bodies. They are fat-soluble, bioaccumulate and increase in concentrations in the food chain.

Dioxin are the products of incomplete combustion and are created through incineration that include chlorine-containing substances, for example polyvinyl chloride plastic (PVC). Dioxin are also formed during the production process of PVC, chlorinated solvents and pesticides, and in other industrial or combustion processes involving chlorine. Once in the air, dioxin can travel long distances and then be deposited in rain, snow and dust and enter the food chain. For example, it falls on grass, is eaten by cows and therefore enters milk and beef. Based on industry sources, production of PVC and its feedstock is responsible for air releases of 11.2 to 31.0 gram dioxin toxic equivalent (TEQ) per year. Because it does not include releases to land and water nor dioxin production at the end of the PVC lifecycle, this quantity may be underestimated.

PVC is often the largest chlorine source in municipal and medical waste incinerators. The link between inputs of chlorine and outputs of dioxin is complicated by combustion conditions; PVC content in uncontrolled burning is directly related to dioxin formation whereas under controlled conditions, other factors (combustion efficiency, temperatures, residence times, presence of other compounds) also play a role but chlorine content is critical.

At very tiny doses, dioxin have been linked to cancer, hormonal changes, neurodevelopmental problems, immune and nervous system disorders, liver damage, reproductive problems and other harmful effects. The Food and Drug Administration (FDA) states that “studies have suggested that exposure to high levels of dioxin by industrial workers may lead to reproductive and developmental problems, increased heart diseases, increased diabetes, and increased cancer.” It also indicates that animal studies have shown that even low levels of exposures over time, or high level exposures at sensitive times, can impact reproduction or development.



Adapted from Institute of Medicine (2003) *Dioxins and Dioxin-like Compounds in the Food Supply: Strategies to Decrease Exposure*

Eating animal-derived foods (e.g., meat, poultry, eggs, fish, and dairy products) is considered to be the major route of human exposure to these contaminants. Saturated fats are a key source of human exposure to dioxin. In 2001, in the first nationwide food survey, scientists reported on levels found in food samples and reported that intake declined with age. While intake may decrease with age, many studies have shown that levels in the body (blood and fat) tend to increase with age.

In 1999, as part of FDA's Total Diet Study (TDS), the Food and Drug Administration (FDA) began annual monitoring for dioxins. Between 2001 and 2004, FDA collected food and feed samples for dioxin analysis. Highest dioxin exposures were for children between 6 months and 6 years with dairy foods and meat contributing the major portion of their exposures (see pie chart). Body concentrations in the general population are near or above levels that cause adverse effects in animal tests. In other words, on average we carry in our bodies levels of dioxin that have been shown to cause health damage in animal tests.

Sources of information:

- Food and Drug Administration (FDA) (2002) FDA Strategy for Monitoring, Method Development, and Reducing Human Exposure <http://www.cfsan.fda.gov/~lrd/dioxstra.html>
- FDA (2003, 2004) Questions and Answers about Dioxins <http://www.cfsan.fda.gov/~lrd/dioxinqa.html>
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