

# Dioxins in Our Food Supply and Their Effect on Human Health

## What are dioxins? Why are they important?

Dioxins are environmental contaminants released into the air from combustion processes, that remain in the environment for many years. They are highly toxic chemical compounds harmful to human health.

## Where do dioxins come from?



Dioxins are released into the air from combustion processes<sup>1</sup>

### Combustion Processes:

- commercial or municipal waste incineration
- burning fuels, such as wood, coal or oil
- burning of household trash
- forest fires



### Natural

- Volcanos
- Forest fires

VS

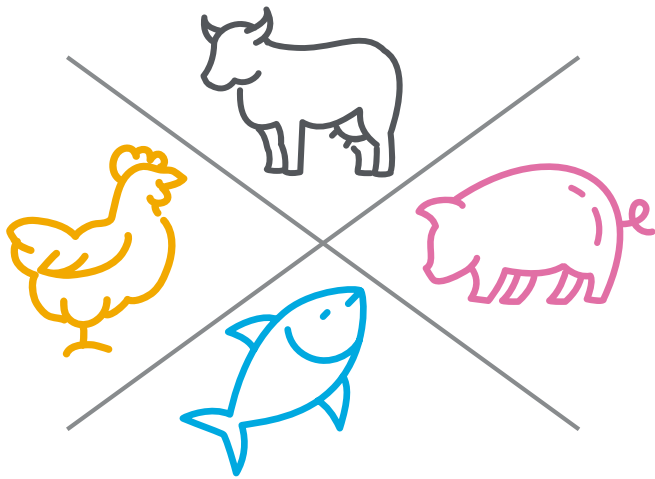


### Man-made

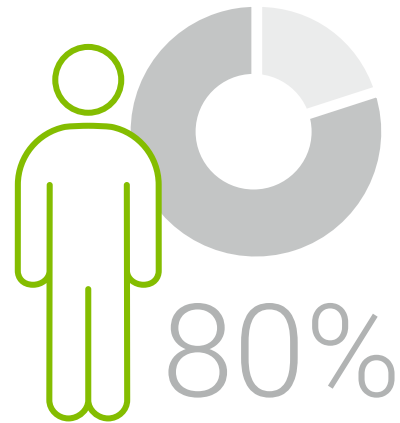
Released into the environment during industrial processes:

- metallurgy
- chlorine bleaching pulp & paper
- cement production
- pesticide manufacturing
- waste incineration

## How are humans exposed to dioxins?



Dioxins accumulate in the food chain<sup>2</sup>  
**Fatty tissues:** beef, dairy cattle,  
pigs, poultry, seafood



Human exposure is from the  
food of animal origin<sup>2</sup>

## What is the impact of dioxins on human health?

Scientists and health experts are concerned about dioxins because exposure may result in a variety of adverse health effects.<sup>3</sup>



**Health risks may include:**

- reproductive and development problems
- immune system damage
- cancer



Once in the human body, it may take 7-11 years  
for dioxin toxicity to fall to half original level

# What measures are being taken to monitor and reduce dioxins?



Strict regulations are in place regarding food samples testing to detect dioxins (at very low levels).<sup>4</sup>

There is a need for greater testing capacity in control labs because of increasingly global nature of the food supply chain, and especially when a crisis occurs.<sup>5-8</sup> For example:



## 2003 Animal Feed

Dioxins were found in animal feed that was contaminated with bakery waste that had been dried by firing with waste wood.



## 2008 Irish Pork

Irish pork and pork products exported to 23 countries was traced, and much recalled, when animal feed was contaminated with dioxins in the feed drying process.



## 2008 Buffalo Milk

In Italy, dioxin was found in buffalo milk from farms in Caserta. The probable source was groundwater contamination from illegal waste dumping in the Triangle of Death (Italy).



## 2011 Meat and Eggs

Meat, eggs and egg products in Germany contaminated from animal feed containing fat contaminated with dioxins. 4,700 German farms were affected. 8,000 hens and hundreds of pigs were culled. Imports from Germany to China were banned.



## 2013 Chicken Eggs

More than a quarter of a million chicken eggs were recalled in Germany after in-house testing discovered 'excessive levels' of dioxin.

# How are dioxins monitored and analyzed?

Government regulatory bodies worldwide are increasingly more concerned about dioxins in our food, and are strictly monitoring specific foods with the goal of identifying ways to reduce dietary exposure.<sup>9</sup>



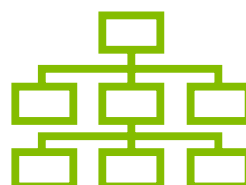
## Sampling and Analysis

Increased sampling and analysis of human foods and animal feeds that contribute most significantly to human dietary exposure to dioxins.



## Field Staff

Expand the capabilities of field staff to collect and analyze increased numbers of food and feed samples for dioxins.



## Trace-back Investigations

Perform trace-back investigations of unusually high levels in food and feeds to determine if the source of contamination can be reduced or eliminated.

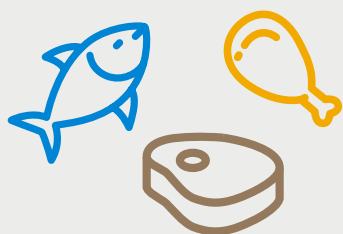


## Research

Enhance research into new or modified methods for dioxin analysis so less time consuming and less expensive methods become available.

# Technology solutions for the detection and analysis of dioxins

Because dioxin analysis is costly and time-consuming, there is an increasing need for technology solutions. Agilent has technology solutions for the detection and analysis of dioxins.



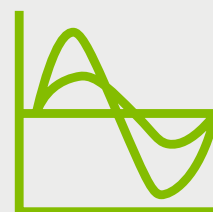
## Food Testing

Provide the capability to perform dioxin testing on food samples including meat, dairy and fish, according to national or international regulations, where such testing needs to detect these compounds at very low levels.



## Greater Testing Capacity

Enable greater testing capacity in control labs because of the increasingly global nature of the food supply chain and especially when a crisis occurs.



## GC/MS/MS Technology

Agilent solutions include triple quadrupole GC/MS/MS technology.

To learn more about Agilent solutions visit:

[www.agilent.com/en/solutions/food-testing-agriculture/persistent-organic-pollutants/dioxins-dioxin-like-compounds](http://www.agilent.com/en/solutions/food-testing-agriculture/persistent-organic-pollutants/dioxins-dioxin-like-compounds)

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