

# Frequently Asked Questions About Fluoride

## Why was ProFume® developed?

ProFume® fumigant (sulfuryl fluoride) was developed as an alternative to methyl bromide for treatment of food commodities and structures that process, store and transport these commodities. Methyl bromide is an ozone-depleting substance and thus is mandated to be phased out globally under the United Nations treaty, the Montreal Protocol. The properties of sulfuryl fluoride were well known, since it had been marketed since 1961 as Vikane® fumigant to eliminate wood-infesting pests that damage structures and their contents. The development of ProFume was made at the request of and in cooperation with globally important food and commodity industries. Its development was recognized with significant environmental awards from the U.S. Environmental Protection Agency (EPA) and the United Nations for protection, innovation and excellence in protecting the stratospheric ozone layer.

## How long has ProFume been used as a post-harvest fumigant?

ProFume was first registered in 2003 in the European Union (EU), in 2004 in the United States (U.S.), and in 2007 in Australia for post-harvest uses.

## What are the desirable characteristics of ProFume as a post-harvest fumigant?

ProFume penetrates enclosed spaces and commodities being treated to eliminate all life stages of pests. It is

effective against a broad-spectrum of pests. It is non-flammable, non-corrosive, and does not affect the characteristics of food commodities. It has established residue tolerances for food commodities.

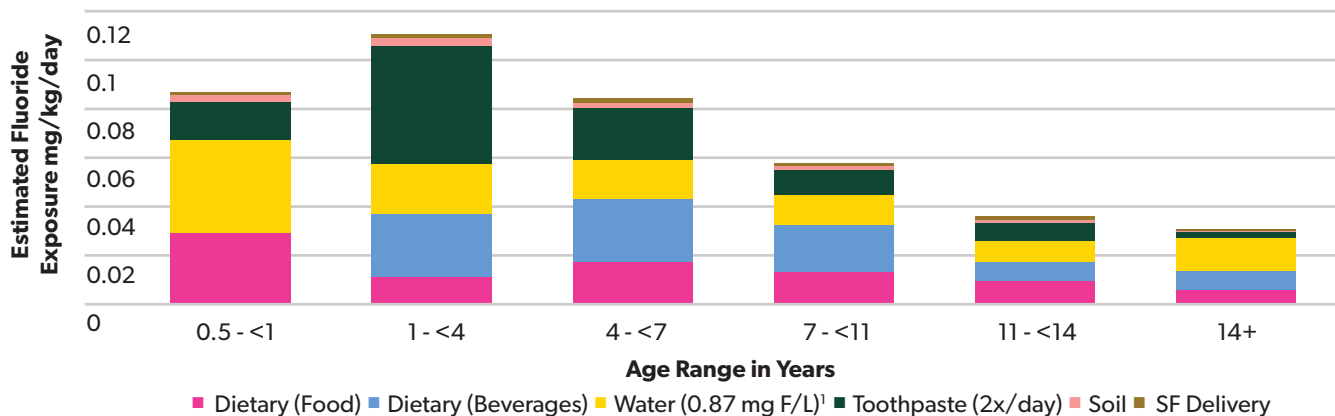
## What is fluoride?

Fluoride is the simplest anion of fluorine, an atomic element. It is an abundant element estimated to be the 13th most abundant element in the earth’s crust and is widely dispersed in nature. Fluoride occurs naturally in soil, plants and water at variable concentrations. Elevated fluoride levels in water are related to certain geologic formations that are rich in fluoride-containing minerals which leach into groundwater or surface water. Fluoride is released into the atmosphere by natural sources, such as volcanoes, and from some industrial sources.

## Is fluoride beneficial to health?

Fluoride is considered a micronutrient for human health, necessary to promote healthy bone growth and prevent dental cavities. Public water fluoridation is common and has been shown to reduce tooth decay by about 25% over a person’s lifetime (U.S. Centers for Disease Control, 2011). Like other nutrients (e.g., vitamins, etc.) too much fluoride can cause problems. Overexposure to fluoride can result in dental fluorosis that occurs during the period of tooth development, usually from birth to 6-8 years of age. The largest sources of fluoride by ingestion are fluoridated water and fluoridated dental products. Products fumigated with ProFume are estimated to contribute only 0.7% to 2.3%, to total daily fluoride intake (Figure 1).

FIGURE 1. Estimated Fluoride Contribution by Source per Age Group.



<sup>1</sup> U.S. EPA recommended range of fluoride concentration in drinking water includes 0.87 mg F/L.

## How are humans exposed to fluoride?

Human exposure to fluoride is predominantly from consumption of fluoridated water and other beverages, food, and fluoridated dental products such as toothpaste (Figure 1). The level of fluoride in drinking water can range from insignificant to high depending upon the water source and time of year. Animal and plant materials included in the human diet contain fluoride absorbed from the soil and water. In Figure 1, the amount of fluoride in water used to determine dietary exposure is 0.87 mg/L. This level is within the U.S. EPA recommended range of fluoride concentration in drinking water.

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## How are residue tolerances and fluoride contribution determined for ProFume® fumigant?

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## What does ProFume fumigation of food commodities contribute to total fluoride exposure?

The current dietary risk assessment in the U.S. estimates ProFume fumigation of food commodities contributes a negligible amount of fluoride, only 0.7% to 2.3%, to total daily fluoride intake (Figure 1).

## Does ProFume fumigation of food commodities contribute more risk to children than to adults for over-exposure to fluoride?

ProFume fumigation of food commodities contributes a negligible amount of fluoride to the total fluoride daily intake to children as well as adults (Figure 1). Both children and adults receive their exposure to fluoride predominantly from consumption of water and other beverages, food, and fluoridated dental products such as toothpaste (Figure 1). The U.S. EPA has stated: "The aggregate risk estimates for the U.S. population and all subgroups, including those of infants and children, are below the (EPA) Health Effects Division's level of concern. The Health Effects Division notes that based on the assumptions in these assessments, sulfuryl fluoride (ProFume) is an insignificant source of fluoride relative to that coming from water, toothpaste and background residues in food." Regulatory authorities in the EU and Australia have reached similar conclusions.

## Should I be concerned about fluoride exposure related to fumigation with ProFume?

No, U.S. EPA Health Effects Division notes that based on the assumptions in these assessments, sulfuryl fluoride (ProFume) is an insignificant source of fluoride relative to that coming from water, toothpaste and background residues in food. Regulatory authorities in the EU and Australia have reached similar conclusions.



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