



Institute for Agriculture and Trade Policy

# Mercury and High Fructose Corn Syrup: Frequently Asked Questions

*IATP published Not So Sweet: Missing Mercury and High Fructose Corn Syrup in January 2009. These are answers to some of the common questions from the report.*

## **What is mercury?**

Mercury is a toxic heavy metal. The American Academy of Pediatrics says mercury also is an “ubiquitous environmental toxin that causes a wide range of adverse health effects in humans. Three forms of mercury (elemental, inorganic, and organic) exist, and each has its own profile of toxicity.”<sup>1</sup> In other words, any form of mercury is toxic and the safest exposure to mercury is none at all.

## **Who is at greatest risk from exposure to mercury?**

We all have some exposure to mercury, which is ubiquitous in the environment. The developing fetus and young children are thought to be disproportionately impacted by mercury exposure because many aspects of development, particularly brain maturation, can be disturbed by mercury’s presence.<sup>1</sup> Across the population, pregnant women are already thought to be exposed to sufficient environmental mercury to put hundreds of thousands of their future children at risk, such as for reduced IQ or problems with learning. If high fructose corn syrup (HFCS) too is contaminated with mercury, it represents an additional source of mercury exposure in an ingredient that is nearly ubiquitous in the modern diet, and one that is completely unnecessary.

## **In what foods and/or beverages did you find mercury?**

In the fall of 2008, we looked for total mercury in 55 brand-name food and beverage products where HFCS was the leading or second highest ingredient. An independent laboratory found total mercury, above the limit of detection, in about one in three products, including: dairy beverages, soft drinks, salad dressings, barbecue sauces, flavored syrups and jams. In other words, we found total mercury across the range of foods and beverages in which HFCS is routinely used.

## **Why do you think the mercury in the foods you tested came from HFCS?**

Everything points to HFCS as the source of the mercury. The separate peer-reviewed article just published by Dufault and co-authors in *Environmental Health* confirms mercury contamination of about half (nine of 20) of samples of commercial HFCS collected in 2005. And HFCS was the top or second highest ingredient in all of the 55 products we had tested. It is possible, but considerably less plausible, that the mercury contamination came from elsewhere. Both our data and common sense point to contaminated HFCS as the most plausible source of the mercury. We encourage comprehensive testing by the FDA to provide the data necessary to test this notion. It is too bad such testing was not begun in 2005, when the FDA first became aware of this concern. If mercury is entering these food products from sources other than HFCS, that is equally important to understand.

### **How would mercury have gotten into HFCS?**

Huge chlorine (chlor-alkali) plants using mercury cells produce “mercury-grade” caustic soda, hydrochloric acid and other chemicals which are, in turn, used to produce thousands of other products, including food ingredients such as citric acid, sodium benzoate and HFCS.<sup>2</sup> The mercury in these plants can contaminate their chemical products, as well as the broader environment.

In HFCS production, caustic soda and hydrochloric acid are used to separate corn starch from the corn kernel, as well as to adjust the pH of the process. The HFCS industry, according to Vulcan Chemical Company, former operator of one of these plants, is a primary user of “mercury-grade” caustic soda and hydrochloric acid.<sup>2</sup> The *Environmental Health* commentary provides data substantiating that mercury contaminating commercial HFCS is a problem.

### **How up-to-date are these data?**

The corn refining industry claims the data from the two recent studies is outdated. Dufault et al. tested HFCS samples collected by the FDA itself in 2005. They are the only public HFCS data available. If the industry or FDA have additional data on mercury and HFCS, we urge them to make that data publicly available. The Institute for Agriculture and Trade Policy (IATP) report on mercury in supermarket foods and beverages was based on samples collected in the fall of 2008. It also is the most up-to-date data, since neither the FDA nor the food industry has publicly released results from any more recent testing for mercury in these products.

If 100 percent of U.S. corn refiners have recently switched from mercury grade chemicals to using chemicals from cleaner technologies for making their HFCS, we urge the industry to inform the public exactly when that transition was made, and how it can be publicly verified. Since HFCS may be produced from mercury-grade caustic soda and other chemicals purchased from non-U.S. sources, we urge the processed food manufacturers to inform consumers of the origin of the HFCS in their products.

### **Are the amounts of mercury found in HFCS worrisome?**

Sure they are. *Any* amount of mercury found in HFCS is worrisome, especially if it came from the ingredients used to make HFCS. Americans get 10 percent of their calories from HFCS, on average. In addition, this mercury exposure is avoidable. HFCS can be made using caustic soda and hydrochloric acid from the majority of plants *NOT* using mercury technology. These alternative technologies are not only cleaner, but more efficient.

### **Can one estimate how much total mercury Americans may be ingesting through HFCS?**

Results from the Dufault article and our testing were both snapshots in time. We don’t know what type(s) of mercury appeared in either set of tests. But given the amount of HFCS Americans consume, we need to better understand the risk—because it could be substantial. This seems a little more responsible, rather than venturing a guess at the actual amount of risk

### **Is the mercury in HFCS the same as mercury in fish and seafood?**

The kind of mercury in fish and seafood is called methylmercury. We tested for total mercury in supermarket items. That could include methylmercury, other forms of mercury, or some mixture of different mercury forms. We just do not know. But again, all forms of mercury are considered toxic, and exposure should be minimized, especially for pregnant women, women of childbearing age and children.

**How can I find products on the supermarket shelves with HFCS that was not produced with mercury-grade caustic soda?**

Right now, there is no way a consumer can tell where the HFCS (or any other ingredient) in their processed foods came from, or how it was produced. That is one reason why it is so important to have a proactive, well-funded FDA or other food safety agency that sees its mission as testing the food supply so as to identify foods with mercury, melamine or other toxic compounds before they land on supermarket shelves.

**Aren't the levels of mercury you found too low to pose a risk?**

The levels were low, but certainly not riskless. Most of what we know about mercury comes from studies of one form—methylmercury—found mostly in fish and seafood. It is part-per-billion levels of methylmercury in fish that have led to state and federal guidelines for certain people to limit consumption of species of fish known to be higher in methylmercury. The guidelines are aimed at pregnant women, women of childbearing age and young children because it is thought that the young developing brain in fetuses and infants is the organ at greatest risk from harm to even low levels of mercury. For these vulnerable populations exposed to mercury during development, the evolving science suggests there may be no level of mercury exposure that can be considered totally safe.

**Only 10 percent of U.S. chlor-alkali production still uses mercury cell technology. Is this a problem that is taking care of itself?**

First off, the slow decline in use of mercury cells has only come with decades of lawsuits and campaigning from nonprofit groups like ours—even though the replacement technology is available, cleaner and more efficient.

Five chlorine plants in the United States, and many more overseas,<sup>3</sup> continue to use mercury cell technology that emits tons and tons of mercury into the environment every year. These plants likely also sell mercury-contaminated caustic soda and other food-grade ingredients all over the world, including to makers of HFCS that ultimately lands on American supermarket shelves. If American mercury cell plants shut down tomorrow, it would not spell the end of mercury contamination of the American food supply, in all probability. Because of the toxicity of mercury, this will continue to be worrisome until the last of the plants transitions to safer technology.

**What should be the next steps for government and industry?**

Congress can act immediately to pass legislation that will phase out mercury cell technology in U.S. chlorine plants. However, this will not address any HFCS made from mercury-grade caustic soda manufactured in overseas chlorine plants.

Corn refiners can immediately act to produce HFCS using ingredients that did not come from mercury cell plants. Food manufacturers can choose to buy HFCS only made using caustic soda, hydrochloric acid and other food ingredients that are mercury-free.

The FDA should begin testing all the commercial grade HFCS used in producing foods or beverages sold in the U.S. for mercury. Those findings should be made public.

## Notes

<sup>1</sup>Goldman L, Shannon MW. Technical report: Mercury in the environment: Implications for pediatricians. *Pediatrics*. 2001;108(1):197-205. Available at: <http://aappolicy.aappublications.org/cgi/reprint/pediatrics;108/1/197.pdf>. Accessed January 29, 2009.

<sup>2</sup>Dufault R, LeBlanc B, Schnoll R, Cornett C, Schweitzer L, Patrick L, Hightower J, Wallinga D, Lukiw W. Mercury from chlor-alkali plants: measured concentrations in product sugar. *Environmental Health*. 2009;8:2 doi:10.1186/1476-069X-8-2.

<sup>3</sup>Euro Chlor. Chlor-alkali industry welcomes European legislation on mercury export ban and safe storage. Available at: <http://www.eurochlor.org/news/detail/index.asp?id=272>. Accessed January 30, 2009.

See also: Wallinga D, Sorenson J, Mottl P, Yablon B. Not so sweet: Mercury and high fructose corn syrup. Institute for Agriculture and Trade Policy. 2009. Available at: [www.iatp.org](http://www.iatp.org).

For more on high fructose corn syrup and mercury, visit IATP's Health Observatory at [www.healthobservatory.org](http://www.healthobservatory.org).

*This fact sheet was authored by David Wallinga, M.D.,  
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