

Overexposed To Bisphenol F? Blame Mother Nature

BY [STEVE HENTGES](#) | AUGUST 2ND 2019 11:51 AM



Whether you realize it or not, there's a good chance that you are being exposed to bisphenol F (BPF). There's even a fair chance that you are highly exposed. If so, should you be concerned and what should you do about it?

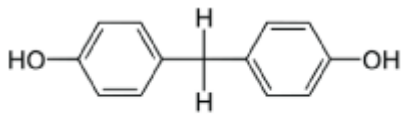
Up until a few years ago, BPF was a fairly obscure industrial chemical used to make certain resins and coatings. There wouldn't have been much reason to think that you could be exposed to BPF at all, much less any significant amount.

That changed a few years ago when scientists with the Swiss Federal Food Safety and Veterinary Office (FSVO) [reported](#) that mild mustard contains significant levels of BPF, a result soon [confirmed](#) by German government scientists. Even more surprising than its mere presence, these studies also reported that BPF is not a contaminant but is produced from a component naturally present in mustard seeds when the seeds are processed to make mustard.

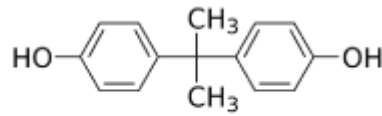
More recently a group of scientists from the European Food Safety Authority (EFSA) [reported](#) that a variety of edible plants used as food supplements or traditional Chinese medicines also contain BPF. As with mustard, BPF is naturally present in these plants and it's quite possible that BPF is naturally present in other plants that we use as foods or supplements.

Even so, how much of a concern could this be? After all, BPF is produced by Mother Nature and how much mustard and traditional Chinese medicine can you eat anyway? As it turns out, a fair amount of data published in the last few years suggests that, at least for some people, the answer may be quite a bit.

It would still be easy to conclude that consumption of BPF through food is of no concern, except for one inconvenient fact. Bisphenol F is a close chemical cousin to the synthetic chemical [bisphenol A](#) (BPA).



Bisphenol F



Bisphenol A

That's the same BPA that has been surrounded by controversy for many years due to claims that low doses of BPA are associated with a wide range of potential health effects. Although much less studied, [similar claims](#) have recently been made about BPF. In light of repeated appeals to ban BPA, could now be the time to also ban mild mustard and traditional Chinese medicines that contain BPF?

Exposure to BPF – What We Know and How We Know It

One of the best ways to measure human exposure to chemicals is a scientific method known as biomonitoring, which involves measurement of a chemical or its metabolite in a biological tissue or fluid. For BPA, biomonitoring is particularly useful since BPA is [rapidly and completely eliminated](#) from the body in urine after exposure. How much BPA enters the body is readily measured by how much comes out in urine. Well [over 100](#) urine biomonitoring studies have been conducted on BPA around the world over the last 15-20 years and consistently show that exposure to BPA is low.

Available data on BPF indicates that it also is rapidly eliminated from the body in urine after exposure, which means that urine biomonitoring is also useful for measuring exposure to BPF. Perhaps due to the (mistaken) belief that other bisphenols, for example BPF, are widely being used as alternatives to BPA, a number of urine biomonitoring studies on BPF have been conducted in recent years.

A comparison of urine biomonitoring results for BPA and BPF is both interesting and informative. Of particular interest are studies from [Australia](#), [Canada](#), [Saudi Arabia](#), [Sweden](#), and the [United States](#) that report detection frequencies, typical levels (i.e., median values) and maximum levels of BPA and BPF in urine from the same participants.

In each case, the detection frequency for BPA is higher than for BPF. For many participants, the amount of BPF in urine, if it was present at all, was below the level that could be detected. In contrast, BPA was detected in the urine of nearly all

participants. This is expected since BPA is more widely used, in particular in products that consumers might contact.

Likewise, the typical levels are higher for BPA than for BPF, which is also expected for the same reason. Based on how these substances are used, we would expect more exposure to BPA than BPF.

Where it gets interesting is the comparison between maximum levels. In each study, the maximum level for BPF is higher than for BPA, in one case more than eight times higher. This unexpected result does not make sense based on how BPA and BPF are used and in light of the data on detection frequency and typical levels. However, it would make sense if the highest exposure levels correspond to individuals who consumed mustard (or traditional Chinese medicines that contain BPF).

The [study](#) that reported the highest level of BPF was conducted on a group of Canadian women with urine samples collected in their second trimester of pregnancy and then again at three months postpartum. The researchers also collected information on what the participants consumed in the 24 hours before urine collection.

Indeed, the two participants with the highest BPF levels reported consuming mild mustard in the preceding 24 hour time period. Based on this observation and other related dietary data they collected, the researchers concluded that "*[f]or BPF, mustard consumption may be an important exposure source, particularly among the highest exposed.*"

In addition, the researchers estimated intake of BPA and BPF for each participant. Consistent with many other biomonitoring studies worldwide, all intakes of BPA were below the most stringent safe intake limit for BPA, which is the Tolerable Daily Intake (TDI) for BPA in Europe.

However, intake of BPF in the most highly exposed participants exceeded the safe intake limit for BPA. A safe intake limit specifically for BPF has not been set but the one for BPA is a reasonable surrogate given the close similarity between BPA and BPF.

Now That We Know, What Should We Do About It?

If you subscribe to the precautionary principle, the obvious action to consider is to ban mild mustard and traditional Chinese medicines that contain BPF. After all, there is evidence for human exposure at potentially unsafe levels.

To date though, no such calls to action have been made and there are good reasons not to do so. For starters, mustard and traditional Chinese medicines have been used for centuries, with no known ill effects. As noted by the authors of the first [report](#) on BPF and mustard, *“now we realise that BPF has been consumed over centuries in a popular condiment”* and *“we are not aware of any study connecting mustard consumption with an increased risk for human health.”*

As further [noted](#) by two European experts at the time, *“one could ask the question whether or not centuries of chronic low-dose or intermittent high-dose exposure to BP-F may have had a detrimental (endocrine) health effect in humans ... However, this seems unlikely...”* It’s no more likely now that we know BPF is also present in traditional Chinese medicines, which may have been in use even longer than mustard.

Perhaps most importantly is the current state of science on BPA. The TDI for BPA used as a surrogate safe intake limit for BPF was conservatively set by EFSA in 2015 as a temporary TDI. The reason for the temporary designation is that EFSA planned to revisit its assessment of BPA when the results of the CLARITY study on BPA are available.

Although the EFSA assessment is just beginning, we already know the [results](#) of the CLARITY study, which was conducted by senior FDA scientists to resolve remaining uncertainties about the safety of BPA. The study is of unprecedented scope and magnitude for BPA.

The results indicate that BPA has very little potential to cause health effects even when people are exposed to it throughout their lives. As [stated](#) by the study’s Principal Investigator, *“BPA did not elicit clear, biologically plausible, adverse effects”* at any dose even remotely close to typical human exposure levels.

Although the CLARITY results are directly applicable only to BPA, they are informative to the safety of BPF given the close chemical similarity between BPA

and BPF. For good reasons, we can expect that mustard and traditional Chinese medicines containing BPF will be with us for centuries to come.