

Comments on Greenpeace technical background document on mixed halogenated dioxins and furans¹

Background

The Greenpeace paper is a literature survey about the potential incremental effects of mixed halogenated dioxins and furans on the overall toxicity of dioxins and furans. In general, this reviewer believes it is a well written and researched paper, but the conclusions do not seem to be in line with the preceding survey of the science.

Formation

Mixed halogenated dioxins and furans are formed similarly to chlorinated or brominated dioxins and furans. Their formation is depending on the starting material. When there is only (or mainly) chlorine-containing starting material present, formation of chlorinated dioxin and furans is observed; when there is only bromine-containing starting material present formation of brominated dioxin and furans is observed. Consequently, when there is a mix of both chlorine and bromine -containing starting material present, mixed halogenated Dioxin and Furans are formed.

As described above, mixed halogenated dioxin and furans can be formed during incineration of brominated flame retardants- containing waste together with other waste (other waste will always contain chlorine, usually about 10 times the amount of bromine). However, EU incinerators are strictly regulated and thus a significant formation of any dioxins and furans is prevented.

Uncontrolled combustion can yield comparatively higher amounts of mixed halogenated dioxins and furans than standard incinerators. This fact is used in the Greenpeace paper to call for a ban of brominated flame retardants in order to eliminate the potential source of mixed halogenated dioxin and furans. Following the same logic, however, all chlorinated substances should be banned as well and indeed all organic substances since they form carcinogenic polycyclic aromatic hydrocarbons during uncontrolled combustion. Uncontrolled combustion should be avoided for a range of reasons (emissions of polycyclic aromatic hydrocarbons, toxic metals such as mercury, cadmium, etc) – mixed dioxins and furans are one of the lesser problems caused by this practice.

Toxicity

Very little is known about the toxicity of mixed halogenated dioxin and furans. They could be more or less toxic than their chlorinated or brominated analogues. Also, they could be more or less stable. Since

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Mixed halogenated dioxins and furans: a technical background document ,Kevin Brigden & Iryna Labunska, Greenpeace Research Laboratories Technical Note 03/2009, June 2009
<http://www.greenpeace.to/publications/mixed-dioxins-furans-background-2009.pdf>

too little is known about this particular issue, the WHO was not in a position to assign toxicity values to them.

In its report Greenpeace raises a concern that we therefore may be missing a significant part of the overall dioxin and furan exposure. As mentioned above, this is speculation since we know too little about the potential effects of chlorinated dioxins and furans. For this reason, no conclusion can be drawn. Moreover, as mentioned further below, the actual exposure to these substances seems negligible.

Exposure is low

The paper acknowledges that humans are exposed to "levels . . . significantly lower than those of chlorinated congeners", so the actual exposure and therefore the potential to cause a risk is very low.

In fact, the paper acknowledges that monitoring studies (including a detailed study by the WHO) have looked for these substances but did not detect them in human milk.

Summary

- The paper indicates that little is known about the toxicity of mixed halogenated dioxins and furans.
- The authors acknowledge that humans are basically not exposed to these substances or only to a very limited extent. Therefore, overall these substances currently do not seem to pose a risk to human health.
- Mixed halogenated dioxins and furans can potentially be formed in uncontrolled combustion. However, for a number of reasons this practice should be avoided altogether and the potential formation of mixed halogenated dioxins and furans is probably one of the lesser problems caused by it.

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