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Dioxins in Plastic Toys: EXECUTIVE SUMMARY

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This study found significant levels of toxic brominated dioxins (PBDD/Fs) accompanying brominated flame retardants in nine samples of consumer products made from recycled plastics. PBDD/Fs are as toxic as the better-known chlorinated dioxins and furans (PCDD/Fs). In addition, PBDEs and PBDD/Fs are endocrine disrupting chemicals, which may impact the hormone levels in children through uptake from e.g. house dust and toys. They can, for example, affect brain development, damage the immune system and fetus, or induce carcinogenesis.

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Analyzed consumer products were children's toys and a hair clip from 7 countries on 4 continents which had already been analyzed for PBDE content in previous studies. The significant contamination of children's products by PBDD/Fs ranged from 5,600 – 386,000 pg/g (56 – 3,800 pg WHO-TEQ/g). This is on the scale of PBDD/Fs found in a variety of hazardous wastes, including waste incineration bag filter ash, waste incineration bottom ash, residues of burned printed circuit boards, and in waste incineration ash after de novo synthesis. Dioxin-like activity measured by the DR CALUX method was found at similarly serious levels in these consumer products. This screening method allows monitoring of PBDD/Fs in a cost- and time-efficient manner.

A toy from Germany made of recycled plastic with levels of PBDEs that meet the current regulatory proposal (1,000 or 500[1] ppm PBDEs) contained 386,000 pg/g PBDD/Fs (3,800 pg WHO-TEQ/g). This signals that weak regulation of PBDEs can pose potential harms not only from PBDEs, but also from PBDD/Fs. In addition, the German regulation of PBDD/Fs does not address the most problematic PBDD/F congeners occurring as impurities in PBDEs. To provide more protective regulations, the following policies are needed:

1/ Not to allow the proposed 1,000 ppm limit for DecaBDE in recycled plastics, but rather establish a 10 ppm limit

2/ A more stringent limit for the definition of POPs waste (Low POPs Content Level),[2] ideally to establish it at a level of 50 ppm for the sum of all regulated PBDEs

3/ To withdraw the recycling exemptions for commercial PentaBDE and OctaBDE as they are currently established under the Stockholm Convention and registered in the EU and several other states.

4/ Add PBDD/Fs to the Stockholm Convention for global reduction and elimination[3]

5/ Improve the definition of electronic waste within the framework of the Basel Convention

PBDD/Fs in electronic-waste, electronic devices (such as TVs) and automotive plastics represent serious threats for recycling of plastics and consumer products made of it. The total amount of PBDD/Fs as an impurity in the produced volume of PBDEs has been recently estimated to be at least 1,000 t. This amount represents a very significant burden for human health and the environment considering the fact that PBDD/Fs are suggested to exhibit toxicity similar to PCDD/Fs.

There is also a need to stop the uncontrolled movement of electronic waste and BFR-contaminated plastics from automotive industry into developing and transition countries. Plastics from these waste flows were the likely origin of recycled plastics for the production of toys analyzed in this study.

1 This level was proposed by the European Parliament as an alternative to the current EU level of 1,000 ppm for Low POPs Content level.

2 This limit is called "Low POPs Content" level according to the definition in the Stockholm Convention, and its definition is established by the technical experts group under the Basel Convention in General Technical Guidelines for ESM of POPs waste. This level is defined in Annex IV to POPs Regulation No 850/2004 (POPs Regulation) in the EU.

3 Analysis guidelines for screening and chemical analysis of all toxic relevant PBDD/Fs, PBBs and PCDD/Fs in recycled plastic and products thereof could also help.

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