**New persistent organic pollutants: polybrominated diphenyl ethers**

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**Highlights**

* Persistent organic pollutants
* Polybrominated diphenyl ethers
* Environmental pollutants
* Health, safety and wellness

**1. Introduction**

Persistent Organic Pollutants (POPs) are a group of organic compounds that possess toxic properties, persist in the environment, bio-accumulate through the food web and pose a risk of causing adverse effects on human health and the environment. The European Union (EU) coordinates its Member States being parts to the global Stockholm Convention (SC) on POPs. The Conference Of the Parties (COP) to the SC is cooperating closely with the appropriate bodies under the Basel Convention (BC) on POPs waste to develop guidelines for what is considered Environmentally Sound Management (ESM) of POP containing waste and to establish destruction limits for such wastes. The BC is a global environmental treaty on the control of transboundary movements of hazardous wastes and their disposal. The POPs listed in the two Conventions are to date 26, including some of the PolyBrominated Diphenyl Ethers (PBDEs) (UNEP/POPS/COP.7/INF/27), an important class of Brominated Flame Retardants (BFRs). The last BDE listed in Annex A, to the SC (UNEP/POPS/COP.7/INF/27) in 2017 was decaBDE component (BDE-209) of c-decaBDE with specific exemptions for the production and use. Under the REACH Regulation, decaBDE was registered in 2011 and identified as a Persistent, Bioaccumulative and Toxic (PBT) and very Persistent and very Bioaccumulative (vPvB) substance (UNEP/POPS/COP.7/INF/22).

The Department of Technological Innovations (DIT) of INAIL, for several years, has been part of the Small Intersessional Working Group (SIWG) for the development of Technical Guidelines (TG) on the ESM of wastes consisting of, containing or contaminated with POPs. Considering this background, the present work summarizes and gives an overview on the commercial identity, production and use of POP-BDE potential exposure to them through environmental contamination and, in particular, management of waste contaminated by them, with particular reference to decaBDE. The main purpose of the present work is to make available, in aggregate and immediately usable form, information and useful data for identifying risks to health and the environment and for the adoption of suitable prevention interventions to protect the exposed receptors.

**2. Methods**

Starting from the regulatory framework with which the European Union implement the provisions of the Convention about substances, mixtures, and wastes, the sound management of the POP waste will be illustrated, including information and data for 1) Articles, waste and recycled materials containing PBDEs; 2) Uses and industrial productions; 3) Life-cycle; 4) PBDEs levels in the waste. Moreover, information about the latest activities on the TGs for the ESM of POP wastes as result of the most recent amendments to the Annexes of the Stockholm Convention will be given. Finally, advices about human health and the environment from the adverse effects of hazardous wastes will be provided.

**3. Results and discussion**

The production, marketing or use of decaBDE as a substance or as an element of other substances, in mixtures and in products, is set out in Annex XVII (list of limitations), of the REACH Regulation, which prohibits the production and placing on the market of decaBDE as a pure substance from March 2nd 2019. Directive 2011/65/EU (RoHS Directive) restricts the use of PBDEs, as a substance group, in Electrical and Electronic Equipment (EEE). As this directive restricts PBDEs as a substance group, it also applies to decaBDE. The maximum concentration value for PBDEs is 0.1 % by weight (1,000 mg/kg) in homogeneous materials. According to Annex VII of Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), on the selective treatment of materials and components of EEE, plastics containing BFR have to be removed from any separately collected WEEE. If the total bromine concentration is below 2,000 mg/kg, it is considered that the treatment operator complies with the de-pollution requirements for BFR according to the WEEE Directive. Regarding ESM for WEEE plastics, there is a risk that contaminated recycles enter in the product cycle. The risk can be minimized as far as possible through a higher degree of separation of plastic WEEE containing decaBDE. The current POP Regulation does not yet include decaBDE, but in the specific TGs developed under the Basel Convention it was proposed to include deca-BDE for the sum of POP-BDEs, already limited to 1000 mg/kg

**4. Conclusions**

In waste streams are still introducing goods containing C-decaBDE. Emissions of c-decaBDE to the environment occur at all its life-cycle stages, but they are assumed to be the highest during service-life and during the waste phase. Production and use of c-decaBDE is decreasing but still ongoing in significant quantities. The production and use of the other commercial PBDEs has been stopped in the first decade of the 2000s at a global level. As a consequence, levels in products and wastes, as well as recycled (secondary) materials, are expected to decrease continuously in the coming years.

In addition, an extensive POPs contamination of sites in Countries with transition or development economies has recently emerged. In these Countries POPs wastes are frequently exported, without being adequate capacity to manage them in safety, also due to the scarcity of the controls and to the inadequate implementation of the Conventions [1, 2].

**References**

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