

Fate and behaviour of brominated flame retardants in soil and sediments

Devarajan shanmuganathan^{1,2,*}, Phil Mercurio^{1,2}, Zuliang Chen^{1,2}, Mallavarapu Megharaj^{1,2} and Ravi Naidu^{1,2}

Background

- Brominated flame retardants (BFR) are chemicals which are added to materials during or after manufacturing to slow down and/or inhibit the initial phase of a developing fire.
- Plastics - Electrical and electronic equipment (e.g. housings of TV sets etc.).
- Transportation sector- (i.e automotive and aviation industries)
- Construction and building - (i.e wires & cables, pipes, etc).

Adverse effect of PBDEs

PBDEs and their metabolites can disrupt thyroid hormone and may cause endocrine disruption, neurological developmental disorders and cancer in human beings.

PBDEs in environment and their distribution

- Nearly 96 % of electronics and electrical waste goes to landfill and PBDEs leaches in to the soil[1]. The PBDEs are persistent environmental contaminants and accumulate in soils[2], sediments[3], biosolids[4], animals and human being tissues[5].

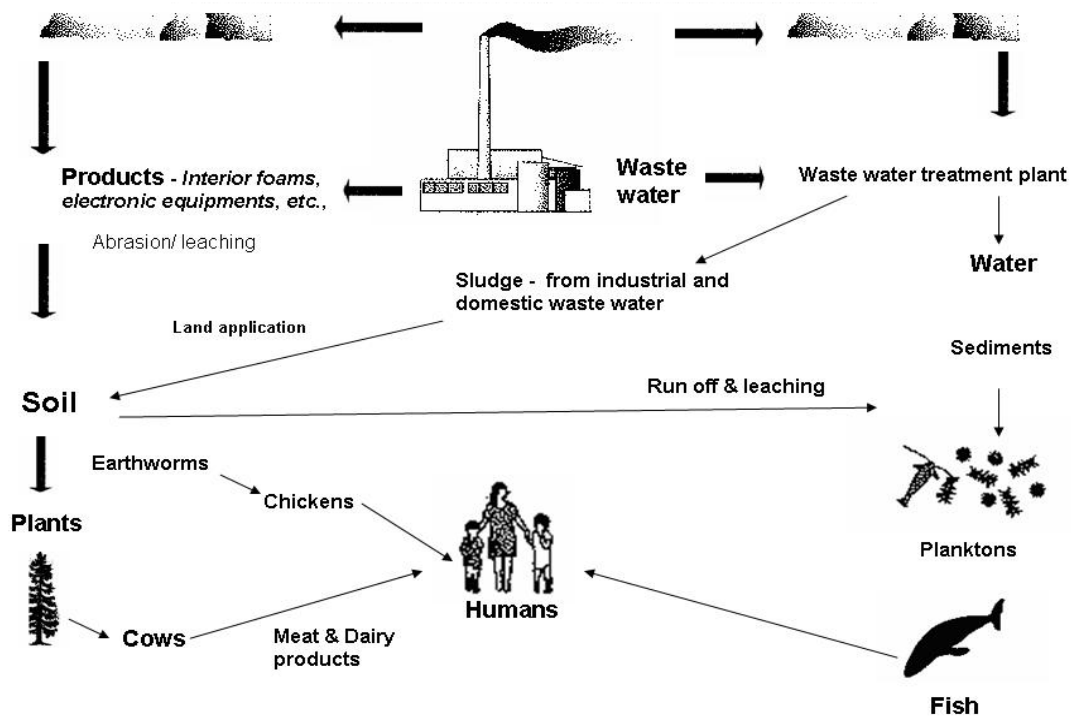


Figure.1 PBDEs release and distribution pathway of brominated flame retardants in environment

Objectives:

BFRs Pollution research at CRC CARE

- Develop analytical method for the determination of PBDE in soils
- Determining PBDEs concentrations in indoor and outdoor in Adelaide surrounding environment
- Study the fate and behaviour of PBDEs in soil using a technical mixture.
- To determine the toxicity, bioaccumulation and biotransformation of PBDEs in biota using a technical mixture
- To develop remediation technologies for PBDE contaminated soils.

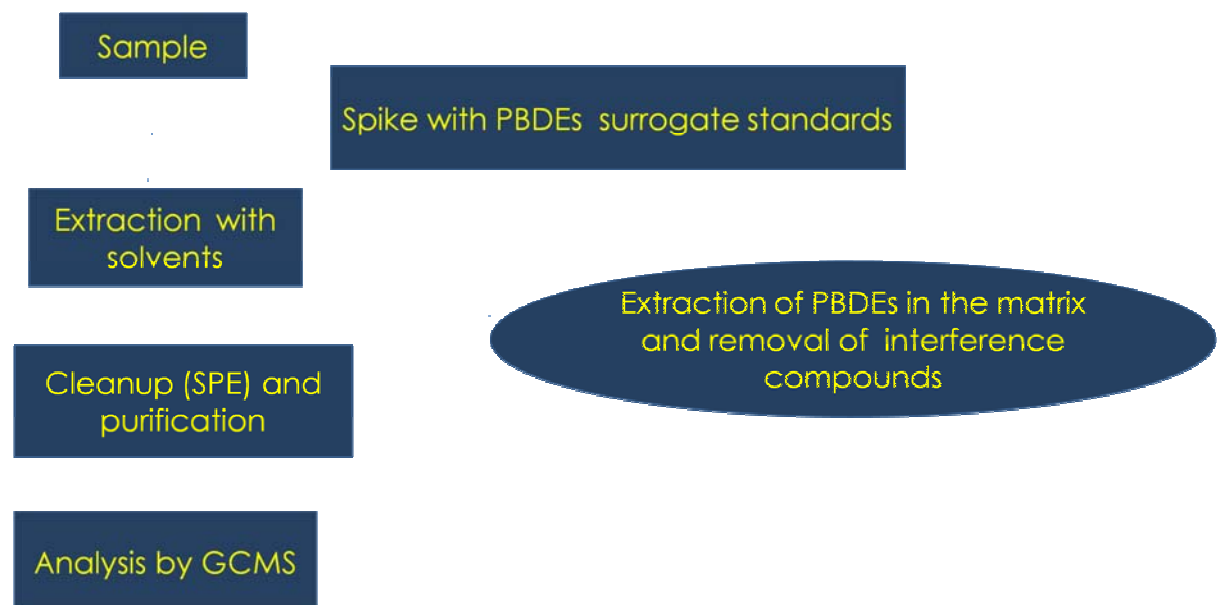
PBDEs in world market (2001)[6]

- PentaBDE - 7500 t/year
- OctaBDE- 3970 t/year
- DecaBDE 56150 t/year

PBDEs in Australian market (2004)[7]

- PentaBDE - 20 t/year
- OctaBDE- 5 -10t/year
- DecaBDE 180 t/year

Method



Results

- Analytical methods for determination of PBDEs in soil and sediments has been developed.
- Determination of PBDEs concentrations in indoor and outdoor environment is in progress.
- Enrichment and isolation of microbes from PBDEs contaminated soils is in progress.
- Toxicity, bioaccumulation and biotransformation of PBDEs in biota using technical mix in soil biota is in progress

Expected outcome

- This PhD research project will result in the development of remediation technology for PBDEs contaminated soils.
- Toxicity, bioaccumulation and biotransformation technical PBDE mixture will be determined.

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- CRC CARE-CRC for Contamination Assessment and Remediation of the Environment

- ¹*CRC CARE-CRC for Contamination Assessment and Remediation of the Environment*
- ²*CERAR-Centre for Environmental Risk Assessment and Remediation*
- *University of South Australia, Mawson Lakes, SA 5095*