

Characteristics and Transformation of Polybrominated Bipenyl Ethers in Tibetan Plateau Soil Contrasting to the East Area in China

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Polybrominated Bipenyl Ethers (PBDEs) is a new-style persistent organic pollutants, mainly originated from brominated Flame Retard in electric products, which is found to be toxic and bioaccumulative. In Tibetan plateau, PBDEs was found in surface soil and atmosphere. However, it is well known that, PBDEs contaminant in Tibetan plateau, especially the sites far away from Lahsa, is not local origination and transported from other area. Although there are some speculations about source area of PBDEs in Tibet, little evidences to prove those conclusions [1,2]. So, our study intends to found whether PBDEs in Tibet is relative to those in East China by analysis of PBDEs congeners' characteristics in soils. In addition, transformation of PBDEs absorbed in soil is similar or not while they are in Tibet or East China. PBDEs have 209 congeners from PBDEs-1 to PBDEs-209, while number of bromine atom in compound change from 1 to 10. Commonly, degradation of PBDEs in media is from high to low bromine. Figure 1 shows the sampling sites of soil in Tibetan and the east China.

Based on contrasting composes of PBDEs congeners in Tibetan and East China Soil, it is found that:

- (1) Ratio of light congeners ($\sum \text{PBDE1-47} / \sum \text{PBDE1-209}$) is ca. 72wt%, and PBDE209 just is 1.3wt% in Tibetan area. In east area, 15.7%wt for sum of light congeners and 68.1%wt for PBDEs209.
- (2) In east area, the ratio of high brominated congeners ($\sum \text{PBDE153-209} / \sum \text{PBDE1-209}$) is linear to that of light congeners ($\sum \text{PBDE1-47} / \sum \text{PBDE1-209}$), which indicates that light congeners is relative to that high ones, or light congeners was transformed from high ones in soils. However, such relationship between high and light congeners cannot be found, which also suggested that light congeners are not directly originated from degrade of high ones in soils.

Based on analyzing the relativity between the content of clay in soils with PBDEs congeners in different degrading level, the transform of PBDEs in soil is found as following:

- (3) In Tibetan plateau, the ratio of light congeners and high ones are negatively related to the content of clay in soil, which suggests that high or light congeners are all undergone photo-degrade by the catalysis of clay in soils. The light congeners are also transferred with high ones from other areas.
- (4) In East China, the ratio of high congeners is negatively related to the content of clay in soil, while ratio of light congeners is positively related to the content of clays. It suggested that clay catalyzed photo-degrade from high congeners to light ones. Because the source is local, soil firstly absorbed high congeners, then degraded into light ones due to the catalysis of clay in soil.

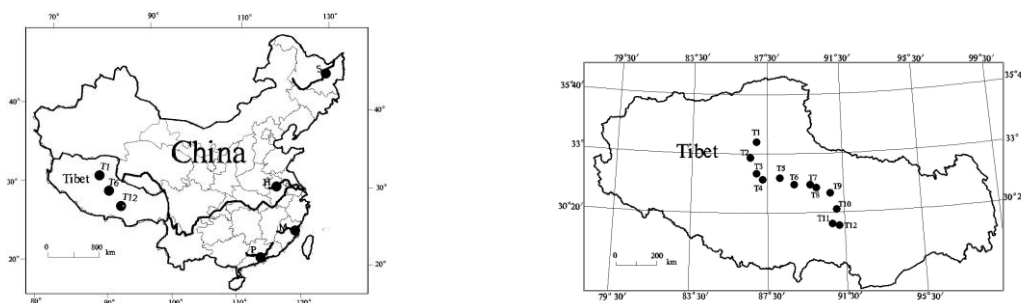


Figure 1. The map of sampling sites

References

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