[ID-P#118] Evaluating PBDE Levels in Kuwaiti Soil: Insights into Regional Variability and Pollution Sources

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Objectives: The primary objective of this study is to evaluate the concentration levels and distribution patterns of polybrominated diphenyl ethers (PBDEs) in soil samples collected from four distinct locations in Kuwait. The study aims to identify the regional variability in PBDE contamination and to explore potential pollution sources contributing to these variations.

Methods: Soil samples were collected from four locations in Kuwait: Shuaiba, Amghara, Al Shaqaya, and KISR. The samples were analyzed for BDE- 66, BDE-209, and Σ10BDEs concentrations using advanced chromatographic techniques. The mean concentrations, standard deviations, and ranges of these compounds were calculated to assess the extent of contamination. Comparative analysis was performed to determine the trend of PBDE distribution across the selected locations.

Results: The study revealed that the mean soil BDE concentrations across the four locations varied significantly, with BDE-66 ranging from 769.6 ± 98.43 pg/g to BDE-209 at 83862.9 ± 11008.25 pg/g. Specifically, BDE-209 concentrations ranged between 65,879.2 and 95,612 pg/g, with a mean value of 83,862.9 ± 11,008.3 pg/g. The Σ10BDEs concentrations ranged from 21,916.5 to 29,742.2 pg/g, with a mean of 26,396.7 ± 2,835.2 pg/g. The total BDE concentrations were found to range from 88,738.2 to 124,310.3 pg/g, with a mean of 110,259.6 ± 13,747.6 pg/g. Notably, both Σ10BDEs and BDE-209 exhibited a concentration trend of Shuaiba > Amghara > Al Shaqaya > KISR.

Conclusion: The findings indicate significant regional variability in PBDE contamination levels in Kuwaiti soils, with the highest concentrations observed in Shuaiba, followed by Amghara, Al Shaqaya, and KISR. This distribution pattern suggests localized sources of pollution, likely linked to industrial activities and waste disposal practices. The study underscores the need for targeted environmental management strategies to mitigate PBDE pollution and protect soil quality in Kuwait.