

1.155 Spatial and temporal trend of Persistent Organic Pollutants in airborne particle matter in Metropolitan Area of Mexico City.

Early Career Scientist

Presenting Author:

Erik Beristain-Montiel, Universidad Nacional Autónoma de México,
Atmospheric Science Center, Mexico City, D.F., Mexico,
erickbm@comunidad.unam.mx

Co-Authors:

Gloria Eliana Arias-Loaiza, Universidad Nacional Autónoma de México,
Atmospheric Science Center, Mexico City, D.F., Mexico

Sandra Lucía Gómez-Arroyo, Universidad Nacional Autónoma de México,
Atmospheric Science Center, Mexico City, D.F., Mexico

Rafael de Jesús Villalobos-Pietrini, Universidad Nacional Autónoma de México,
Atmospheric Science Center, Mexico City, D.F., Mexico

Omar Amador-Muñoz, Universidad Nacional Autónoma de México, Atmospheric
Science Center

Abstract:

Persistent Organic Pollutants (POPs) are a group of halogenated synthetic compounds widely used in common applications as pesticides, dielectric fluids and flame retardants. A large number of compounds are prohibited or restricted by the Stockholm Convention due to their high toxicity, risk to human health and environmental pollution. A simple, fast and green methodology was developed to determine POPs in airborne particle matter using a micro scale cell and ultrasonic assisted extraction. POPs were obtained in an online extraction-filtration-evaporation system and analyzed by gas chromatography – mass spectrometry/negative chemical ionization. Application of this methodology allowed us to study temporal and spatial POPs trend in five urban sites in Metropolitan Area of Mexico City (MAMC) by collecting particles $\leq 2.5 \mu\text{m}$ ($\text{PM}_{2.5}$) in 2013. BDE-99 (pentabromodiphenyl ether), endosulfan and endosulfan isomers were found in all sites and seasons. Endrin aldehyde, dieldrin, DDE and other polybrominated diphenyl ethers (PBDEs) were also found but they were not uniformly distributed. Temporary homogeneous distribution of organochlorine pesticides sum was observed (Kruskal-Wallis, KW, $p = 0.8$). Polybrominated diphenyl ethers sum showed lower concentration in rainy season compared with warm and cold dry seasons (KW, $p \leq 0.02$). Northeast and Southeast showed higher pesticides sum concentrations than Center, Northwest and Southwest of MAMC (KW, $p \leq 0.01$). PBDEs sum was higher in Northeast respect to the rest of MAMC (KW, $p \leq 0.004$). Results showed evidence of POPs contamination in MAMC and for our knowledge this is the first time that POPs were determine in airborne particle matter in urban sites from Mexico.