

US EPA ARCHIVE DOCUMENT

**DEVELOPMENT OF AN ANALYTICAL METHOD TO MEASURE POLYBROMINATED DIPHENYL ETHERS IN ARCHIVED EXTRACTS OF AVIAN EGGS.** M.G. Cantwell, S. Jayaraman and D.E. Nacci. US Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI 02882.

Polybrominated diphenyl ethers (PBDEs) are part of a group of brominated flame retardants used in a wide range of commercial and domestic applications to reduce product flammability. Large scale production of PBDEs started in the early 1970s with their presence in the environment first measured in 1979. Production of PBDEs has increased steadily since then with global annual production in 2001 estimated at 67,000 metric tons. In order to properly assess the level of risk associated with PBDEs, accurate and sensitive methods are needed to measure these compounds. In this study we developed and validated an analytical procedure to measure 13 PBDE congeners in extracts of common (*Sterna hirundo*) and roseate (*Sterna dougalli*) tern eggs originally processed for polychlorinated biphenyl (PCB) analysis. Negative chemical ionization mass spectrometry (NCI-MS) was determined to have much lower detection limits for PBDEs than standard electron impact ionization (EI). Results are presented for eight environmentally ubiquitous congeners (BDEs 17, 28, 47, 66, 99, 100, 153, 154). Provisional PBDE values from a NIST standard reference material (SRM1974b) compared well against our results, indicating excellent extraction recoveries and accurate analytical data. Reanalysis of selected samples for PCBs showed little change in concentrations over time, indicating that analyte loss during archival was not a factor. In addition, PBDE levels in the samples compared well with literature values, providing further evidence of the robustness of the methods used. Overall, results show that previously archived samples can be used to measure other classes of contaminants provided that methodologies and procedures are properly validated.