

Newly Identified DDT-Related Compounds Accumulating in Southern California Bottlenose Dolphins

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ABSTRACT

Nontargeted GC×GC-TOF/MS analysis of blubber from 8 common bottlenose dolphins (*Tursiops truncatus*) inhabiting the Southern California Bight was performed to identify novel, bioaccumulative DDT-related compounds and to determine their abundance relative to the commonly studied DDT-related compounds. We identified 45 bioaccumulative DDT-related compounds of which the majority (80%) is not typically monitored in environmental media. Identified compounds include transformation products, technical mixture impurities such as tris(chlorophenyl)methane (TCPM), the presumed TCPM metabolite tris(chlorophenyl)-methanol (TCPMOH), and structurally related compounds with unknown sources, such as hexa- to octachlorinated diphenylethene. To investigate impurities in pesticide mixtures as possible sources of these compounds, we analyzed technical DDT, the primary source of historical contamination in the region, and technical Dicofol, a current use pesticide that contains DDT-related compounds. The technical mixtures contained only 33% of the compounds identified in the blubber, suggesting that transformation products contribute to the majority of the load of DDT-related contaminants in these sentinels of ocean health. Quantitative analysis revealed that TCPM was the second most abundant compound class detected in the blubber, following DDE, and TCPMOH loads were greater than DDT. QSPR estimates verified 4,4',4''-TCPM and 4,4',4''-TCPMOH are persistent and bioaccumulative.

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