

Nontargeted Biomonitoring of Halogenated Organic Compounds in Two Ecotypes of Bottlenose Dolphins (*Tursiops truncatus*) from the Southern California Bight

Nellie J. Shaul^{1,2}, Nathan G. Dodder³, Lihini I. Aluwihare^{1,2}, Susan A. Mackintosh^{1,4,5}, Keith A. Maruya³, Susan J. Chivers⁶, Kerri Danil⁶, David W. Weller⁶, and Eunha Hoh^{1,4}

¹*Center for Oceans and Human Health, Scripps Institution of Oceanography, University of California, San Diego, 9500 Gilman Drive, La Jolla, California, United States*

²*Scripps Institution of Oceanography, University of California, San Diego, 9500 Gilman Drive, La Jolla, California, United States*

³*Southern California Coastal Water Research Project Authority, 3535 Harbor Boulevard, Suite 110, Costa Mesa, California, United States*

⁴*Graduate School of Public Health, San Diego State University, 5500 Campanile Drive, San Diego, California, United States*

⁵*San Diego State University Research Foundation, 5250 Campanile Drive, San Diego, California, United States*

⁶*Marine Mammal & Turtle Division, Southwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 8901 La Jolla Shores Drive, La Jolla, California, United States*

ABSTRACT

Targeted environmental monitoring reveals contamination by known chemicals, but may exclude potentially pervasive but unknown compounds. Marine mammals are sentinels of persistent and bioaccumulative contaminants due to their longevity and high trophic position. Using nontargeted analysis, we constructed a mass spectral library of 327 persistent and bioaccumulative compounds identified in blubber from two ecotypes of common bottlenose dolphins (*Tursiops truncatus*) sampled in the Southern California Bight. This library of halogenated organic compounds (HOCs) consisted of 180 anthropogenic contaminants, 41 natural products, 4 with mixed sources, 8 with unknown sources, and 94 with partial structural characterization and unknown sources. The abundance of compounds whose structures could not be fully elucidated highlights the prevalence of undiscovered HOCs accumulating in marine food webs. Eighty-six percent of the identified compounds are not currently monitored, including 133 known anthropogenic chemicals. Compounds related to dichlorodiphenyltrichloroethane (DDT) were the most abundant. Natural products were, in some cases, detected at abundances similar to anthropogenic compounds. The profile of naturally occurring HOCs differed between ecotypes, suggesting more abundant offshore sources of these compounds. This nontargeted analytical framework provided a comprehensive list of HOCs that may be characteristic of the region, and its application within monitoring surveys may suggest new chemicals for evaluation.

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