

Naturally Occurring Organohalogen Compounds: Sources, Structures, and Biological Activity

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More than 4300 organohalogen compounds, mainly containing chlorine and/or bromine, are either produced by living organisms or are formed during natural abiogenic processes such as volcanoes, forest fires, and geothermal processes. The ocean is the greatest single source of natural organohalogens and myriad sponges, corals, seaweeds, tunicates, nudibranchs, bacteria, and other marine organisms produce such compounds. Terrestrial plants, fungi, lichen, bacteria, and insects are also significant producers of organohalogen compounds. Nearly all types of organic compounds are represented, including alkanes, aromatic hydrocarbons, phenols, pyrroles, indoles, fatty acids, terpenes, peptides, steroids, alkaloids, acetogenins, furans, and dioxins. Some of the halogenated byproducts of the mammalian immune system, which uses chlorine and bromine to fight infection, have been identified. Dioxins are now recognized to have several natural sources. The first examples of natural bioaccumulative compounds have been discovered in seabirds and in Eskimo women. Clearly, nature employs halogen as a basic building block to construct molecules essential for survival. The notion that these thousands of unique organohalogens are isolation artifacts or the result of anthropogenic activities can now be dismissed. This presentation will discuss recent developments as to the origin, abundance, and biological activity of these natural halogenated chemicals.