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The Importance of Hydroxylated and Methoxylated Polybrominated Diphenyl Ethers

There is considerable interest in hydroxylated PBDEs (OH-BDEs) and their origin. This is especially important because of their higher toxicities relative to the parent PBDEs and the methoxylated PBDEs (MeO-BDEs).

Both OH- and MeO-BDEs have been found in wildlife and humans. Research findings have shown that there are two sources of OH-PBDEs in the environment: natural production in marine ecosystems and biotransformation of synthetic PBDE flame retardants. Certain MeO and OH-BDEs (e.g. 6-MeO/OH-BDE-47, 2-MeO/OH-BDE-68) are natural products in the marine environment and can be found in organisms such as sponges, green algae and Blue Mussels. On the other hand, OH-PBDE metabolites have been found as a biotransformation contaminant in mammals. This has been confirmed by studies of their metabolism. In one study, the metabolism of 2,2',4,4'-tetrabromodiphenyl ether (BDE-47-the most abundant PBDE contaminant in humans and the environment) was confirmed in rats.

Many OH-BDEs, MeO-BDEs, di-OH-BDEs, and even chlorine substituted metabolites, have been identified in rat plasma, human breast milk and human blood samples. It has been concluded that OH-PBDEs having a hydroxyl group in the meta- or para-position to the diphenyl ether bond, and with bromine in the 2- and/or 4-position, are the most likely PBDE metabolites in this scenario. In contrast, all known natural occurring OH- and MeO-BDEs are apparently OH and MeO substituted in an ortho position to the ether bond. This finding is notable because PBDEs with substitution in the meta or para position are a greater threat to health than those with substitution in the ortho position.

AccuStandard is committed to providing an ever-growing number of OH- and MeO-PBDE reference standards for the scientific community. Presently, AccuStandard offers 30 OH-PBDEs and 30 MeO-PBDEs, including hepta- and octabromodiphenyl ether metabolites. All of these compounds have been synthesized in-house. AccuStandard's chemists will synthesize additional compounds on request.