

**APPLICATIONS OF THE IN VITRO AHH INDUCTION BIOASSAY FOR DETERMINING 2,3,7,8-TCDD
EQUIVALENTS: PYROLYZED FLAME RETARDANT MIXTURES**

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ABSTRACT

The pyrolysis of brominated flame retardants FireMaster 300 BA (decabromobiphenyl ether, FireMaster BP-6 (polybrominated biphenyls), Bromkal 70-5-DE (primarily pentabromodiphenylether), Bromkal 70-DE (primarily penta and tetrabromodiphenylether) and Bromkal G1 (pentabromodiphenylether) resulted in the formation of relatively high levels of brominated dibenzofurans (PBDFs) and dibenzo-p-dioxins (PBDDs) as determined by gas chromatography-mass spectrometric analysis. The "2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) equivalents" for the pyrolyzed extracts were determined by measuring their aryl hydrocarbon hydroxylase (AHH) induction potencies in rat hepatoma H-4-II E cells in culture. The "2,3,7,8-TCDD equivalents" levels (ppm) for each of the pyrolyzed flame retardant samples was: 174-194, 480-1400, 2140-4680, 6740-8780 and 3920-5260 for FireMaster 300 BA, FireMaster BP-6, Bromkal 70 DE, Bromkal 70-5 DE and Bromkal G1 [note: the range of equivalents was derived from the values obtained from the AHH and ethoxyresorufin O-deethylase (EROD) enzyme assays]. The "2,3,7,8-TCDD equivalents" in the pyrolyzed FireMaster BP-6 and Bromkal 70-5 DE samples were determined in in vivo studies (rat); there was an excellent correlation between the in vivo and in vitro data and these results further support to the utility of the in vitro induction bioassay for quantitatively determining "2,3,7,8-TCDD equivalents" for toxic halogenated aromatic mixtures.