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Potential application of gas chromatography tandem mass spectrometry in the measurement of coeluting isomers

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ABSTRACT

Despite the unprecedented popularity of separation chromatography, the measurement of coeluting isomeric chemicals remains an extremely difficult task. An analytical scheme capable of measuring two coeluting isomers was developed using a single chromatographic column and a gas chromatography-tandem mass spectrometry (GC/MS/MS) system. The protocol utilized two product (secondary) ion fragments, generated from a common parent molecular ion (primary) associated with the isomers, for quantitation. The utility of the analytical scheme was demonstrated with the measurements of several pairs of coeluting polychlorinated biphenyl (PCB) isomers in standard solutions and fish liver samples. Best results were achieved if the abundance ratio of the two product ion fragments was greater than unity for one isomer and less than unity for the other isomer. Analyses of seven fish liver samples collected from nearshore San Diego indicated that the domain that had been previously reported to comprise PCB 153 and PCB 168 actually contained PCB 153 only. Although only a selected number of PCB congeners were examined, the results indicate that the analytical scheme has the potential to be used to determine the concentrations of all chromatographically coeluted isomers.

Full Text

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