Comparison of conventional gas chromatography and comprehensive two-dimensional gas chromatography for the detailed analysis of aromatic hydrocarbons in gasoline samples

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The precise and accurate determination of aromatic hydrocarbons such as benzene, toluene, ethyl benzene and xylenes (BTEX) as well as the level of total aromatic compounds in gasolines is important for control of refining processes and for government regulatory compliance [1].
Capillary gas chromatography is a separation technique which is used in analytical praxis to separate hydrocarbons in gasoline samples [2, 3]. Flow modulated comprehensive two-dimensional gas chromatography equipped both with flame ionization detector (GC×GC–FID) as well as with quadrupole mass spectrometric detector (GCxGC-QMSD) were used for quantification of C6 through C12 aromatic hydrocarbons. A 25 m capillary with 0.25 mm i.d. and 0.25 μm film thickness of non-polar stationary phase (first dimension) was coupled via flow modulator to 5 m capillary with 0.25 mm i.d. and 0.25 μm of polar ionic liquid capillary column (second dimension). Normalized percents were used to express quantitative data for all individual aromatic hydrocarbons. For total aromatic compounds good agreement with the more complex conventional multidimensional GC technique was obtained. The identification of the aromatic hydrocarbons was confirmed by GC×GC–MS.

References

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