The capillary cold trap as a suitable instrument for mercury speciation by volatilization, cryogenic trapping, and gas chromatography coupled with atomic absorption spectrometry.
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An innovative accessory for speciation analysis has been developed. The system is based on the combination of cryogenic trapping and gas chromatographic separation, carried out within the same capillary. The instrument, hyphenating derivatization, gas-phase extraction, preconcentration, and analyte separation, is semiautomated, and all operational parameters are adjustable via an in-house-developed control unit, which regulates the selected parameters throughout the analysis process. Species detection was carried out by atomic absorption spectrometry. The detection limits achieved were 33, 39, and 71 ng L(-1) for dimethylmercury, methylmercury, and inorganic mercury, respectively. A complete chromatogram could be obtained within three minutes, resulting in the duration of one whole analysis cycle of about 15 min. The proposed method was applied to mercury speciation in freeze-dried tuna fish powder after microwave-assisted extraction, finding that mercury is present at 80% as methylmercury and about 20% as inorganic mercury, in this kind of biological material.

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